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NATURAL CONVECTION IMMERSION COOLING OF AN ARRAY OF HEATED PROTRUSIONS IN AN ENCLOSURE FILLED WITH DIELECTRIC LIQUID: EFFECTS OF ENCLOSURE WIDTH AND FLUID PRANDTL NUMBER

by

Erol Aytar

MARCH 1991

Thesis Advisor: M.D. Kelleher

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URITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

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REPORT SECURITY CLASSIFICATION: Unclassified	1b. RESTRICTIVE MARKINGS
SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT: Approved for public release: Distribution is unlimited
DECLASSIFICATION/DOWNGRADING SCHEDULE	
PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
NAME OF PERFORMING ORGANIZATION: Naval Postgraduate School; 6b. OFFICE SYMBOL (If applicable): ME	7a. NAME OF MONITORING ORGANIZATION: Naval Postgraduate School
ADDRESS (City, State and ZIP Code): Monterey, CA 93943-5000	7b. ADDRESS (City, State, and ZIP Code): Monterey, CA 93943-5000
NAME OF FUNDING/SPONSORING ORGANIZATION; 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBER: PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

TITLE (Include Security Classification)
NATURAL CONVECTION IMMERSION COOLING OF AN ARRAY OF HEATED PROTRUSIONS IN AN ENCLOSURE FILLED WITH DIELECTRIC LIQUID: EFFECTS OF ENCLOSURE WIDTH AND FLUID PRANDTL NUMBER

PERSONAL AUTHORS
EROL AYTAR

a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Master's Thesis	FROM_____ TO_____	MARCH 1991	176

SUPPLEMENTARY NOTATION
The views expressed are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government

COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block numbers)
LD	GROUP	SUB-GROUP	

ABSTRACT (Continue on reverse if necessary and identify by block numbers)

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Power dissipation levels per component ranged from 0.115 W to 2.9 W. Component surface temperature measurements were used to obtain the nondimensional heat transfer parameters. In the case of FC-75 and 30 and 7 mm spacings, and in the case of FC-43 and 7 mm spacing, timewise fluctuations of temperature at steady state in several locations were recorded with increasing power level.

DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION	
XX UNCLASSIFIED/UNLIMITED __ SAME AS RPT __ DTIC USERS	unclassified	
L NAME OF RESPONSIBLE INDIVIDUAL: M.D. Kelleher	22b. TELEPHONE (Include Area Code): (408) 624-7595	22c. OFFICE SYMBOL: ME/Kk

Form 1473, JUN 86 *Previous editions are obsolete.* S/N 0102-LF-014-6603

SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

Approved for public release: Distribution is unlimited

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by

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Lieutenant Junior Grade, Turkish Navy
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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN
MECHANICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL

MARCH 1991

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NOMENCLATURE

SYMBOL	DESCRIPTION	UNITS
A	Area	m^2
A_{total}	Total wetted surface area	m^2
C_p	Specific heat	J/kg °C
emf	Thermocouple voltage	Volt
g	Gravitational acceleration	m/s^2
Gr_f	Flux-based Grashof Number	Dimensionless
Gr_t	Temperature-based Grashof Number	Dimensionless
h	Heat transfer coefficient	W/m^2 °C
k_f	Fluid thermal conductivity	W/m °C
k_p	Plexiglass thermal conductivity	W/m °C
L1	Component length in the vertical direction	m
L2	Summation of the ratios of the component fluid exposed areas to their perimeters	m
Nu1	Nusselt number based on L1	Dimensionless
Nu2	Nusselt number based on L2	Dimensionless
Pr	Prandtl number	Dimensionless
Power	Power dissipated by the heaters	Watts
Q_{loss}	Energy loss by conduction	Watts
Q_{net}	Net power dissipated by the heater	Watts
R_c	Total thermal resistance	°C/W
R_p	Resistance of the precision resistor	Ohms
Ra_f	Flux-based Rayleigh number	Dimensionless
Ra_f	Temperature-based Rayleigh number	Dimensionless
T	Temperature	°C
T_{avg}	Average of component temperature	°C
T_b	Back surface temperature	°C
T_{film}	Film temperature	°C

T_{sink}	Average temperature of the top wall of the chamber	°C
U	Uncertainty value	Various
Volt	Input voltage	Volts
X^*	Nondimensional chamber width	Dimensionless
w	chamber width	mm
α	Thermal diffusivity	m^2/s
β	Thermal expansion coefficient	$°C^{-1}$
ρ	Density	kg/m^3
ν	Kinematic viscosity	m^2/s

I. INTRODUCTION

A. STATEMENT OF PROBLEM

The growing interest in high power dissipation from electronic packages with the improvements in circuit packaging density brought the necessity for enhancements in cooling technology.

A strong need to keep component at temperatures below 100°C exists since for every 20°C decrease in junction temperature, the chip failure rates are cut in half (Oktay, 1986). Natural convection immersion cooling of these packages with dielectric fluids has become important recently because of its enormous promise for high heat dissipation capabilities, together with such added advantages as no noise and high reliability (Liu, Kelleher, Yang, 1987). Natural convection is important for immersion cooling because it governs the lower power devices. In addition, an accurate prediction of natural convection is necessarry for establishing the conditions under which two-phase heat transfer begins.

B. NUMERICAL AND EXPERIMENTAL STUDIES OF NATURAL CONVECTION IMMERSION COOLING

Extensive research has been conducted on the immersion cooling of electronic devices by means of natural convection. Much more basic data than

currently exists are needed as inputs to the design of such cooling systems for optimum thermal performance (Liu, Kelleher, Yang, 1987).

Baker (Vols. 11, 12, 1973) found that natural convection liquid cooling of heat sources (1.0 x 2.6 x 0.12 cm) was three times more effective than natural convection air cooling of the same heat sources. Two different dielectric liquids, Freon 113 (Pr=3.9) and Dow Corning #200 silicone oil (Pr=126) were used. The analysis showed that:

- Convection heat transfer coefficient increases significantly as the heat source size decreases.
- Heat transfer coefficient is proportional to the cube root of the reciprocal of the viscosity.
- Decreasing the heat source surface area from 2.0 to 0.01 cm^2 increased the free convection heat transfer coefficient an order of magnitude under the same operation conditions.

Park and Bergles (1987) conducted experimental studies of natural convection liquid cooling from both discrete flush heaters and protruding rectangular heaters. Heat transfer coefficients (midpoint) were obtained with two heater heights (5 mm and 10 mm) and varying width (2 mm - 70 mm). Water and Freon 113 were used as working fluids. Data indicated that:

- Heat transfer coefficient increases with decreasing width, with the coefficient for 2 mm wide heaters being 150% above that for 20 mm - 70 mm. This effect was greater in Freon 113 than water.
- With in-line flush heaters, the heat transfer coefficients for the upper heaters are lower than those for the bottom heater. With an array of protruding

heaters, heat transfer coefficients for the top heater are higher than those for the bottom heater.

- The heat transfer coefficient for a single protruding heater is about 15% higher than that for a flush surface.
- As the distance between the heaters increases, the heat transfer coefficients for the upper heaters increase.

Chen *et al.* (1988) conducted an experiment on natural convection heat transfer in a chamber with 10 protruding components from one vertical wall. Distilled water and ethylene glycol were used. The top boundary of the chamber was maintained at a constant temperature acting as a heat sink. Experimental results showed that:

- Bottom heater had the highest heat transfer coefficient except at high Rayleigh numbers.
- At high Rayleigh numbers the top heater had the highest heat transfer coefficient.

Liu *et al.* (1987) developed a finite difference analysis of natural convection from an array of 3 by 3 components immersed in FC-75. The top and bottom boundaries of the chamber were assumed to be at uniform temperatures. Results were presented for the chamber widths of 30 and 18 mm. They found that:

- Temperature field in the chamber is characterized by the flow around the components.
- Lesser temperatures were found in the bottom row components, and maximum temperatures on chip surfaces were found on the upper horizontal faces.

- The results for the chamber widths of 30 and 18 mm were almost the same indicating very little effect of chamber width.

- Local oscilatory surface temperatures of the components tended to fluctuate within a range of almost ±3°C with a period of 4 seconds.

Kelleher *et al.* (1987) investigated natural convection of a water-filled enclosure with a long protruding heater from one vertical wall. They carried out both flow visualization and heat transfer measurement for three different heater locations. Flow visualizations indicated two dimensional dual-celled flow structures in the chamber: Buoyancy-driven upper shell which accounts for a majority of the heat transfer and shear-driven lower shell in which the fluid motion arises due to viscous drag from the upper shell.

Joshi *et al.* (1988) investigated natural convection immersion cooling of a 3 by 3 array of heated protrusions in an enclosure filled with FC-75. They found that:

- Flow structure was largely determined by the boundary conditions at low power levels (0.1 W)

- Upon increasing the power levels (0.7 W to 3.0 W), an upward flow developed adjacent to each column of components.

- With increasing thermal input, flow away from the components showed 3 dimensional and time dependent behavior.

C. OBJECTIVES

This experimental study is a continuation of the research conducted at the Naval Postgraduate School by Pamuk (1987), Benedict (1988), Torres (1988) and Powell (1989). The objectives of this thesis are:

- To design and build a new simulated circuit board using tack-welding method for attaching the thermocouples on component surfaces.
- To analyze the data in terms of both dimensional and nondimensional heat transfer parameters for different chamber widths and dielectric fluids.
- To correlate the data in terms of Nusselt number and Rayleigh number for each case.
- To find single correlation for each dielectric fluid to account for the effects of spacing.

II. EXPERIMENTAL APPARATUS

A. GENERAL CONSIDERATIONS

This experimental study is a continuation of past experiments conducted at the Naval Postgraduate School. Effects of the chamber width (spacing) on heat transfer characteristics of the components (3 by 3 array of horizontally placed rectangular aluminum blocks) were examined. Two dielectric liquids were used: FC-75 and FC-43. The top boundary of the chamber was kept at 10°C and the bottom boundary was insulated.

The top view of the chamber assembly is provided in Figure 2.1 (after Torres, 1988). This was the same chamber used by Torres (1988) and Powell (1989) with vertical component arrangement. The horizontal arrangement used in this study was obtained by turning the vertically arranged components 90° around their back surface area centers. A front and side view of the horizontally arranged simulated circuit board is provided in Figure 2.2 (after Benedict, 1988).

The components and heaters are identical to the previous ones in order to compare the results. A more detailed description of the chamber, components, heaters and heat exchangers can be found in Benedict (1988), Torres (1988), Powell (1989) and Pamuk (1987).

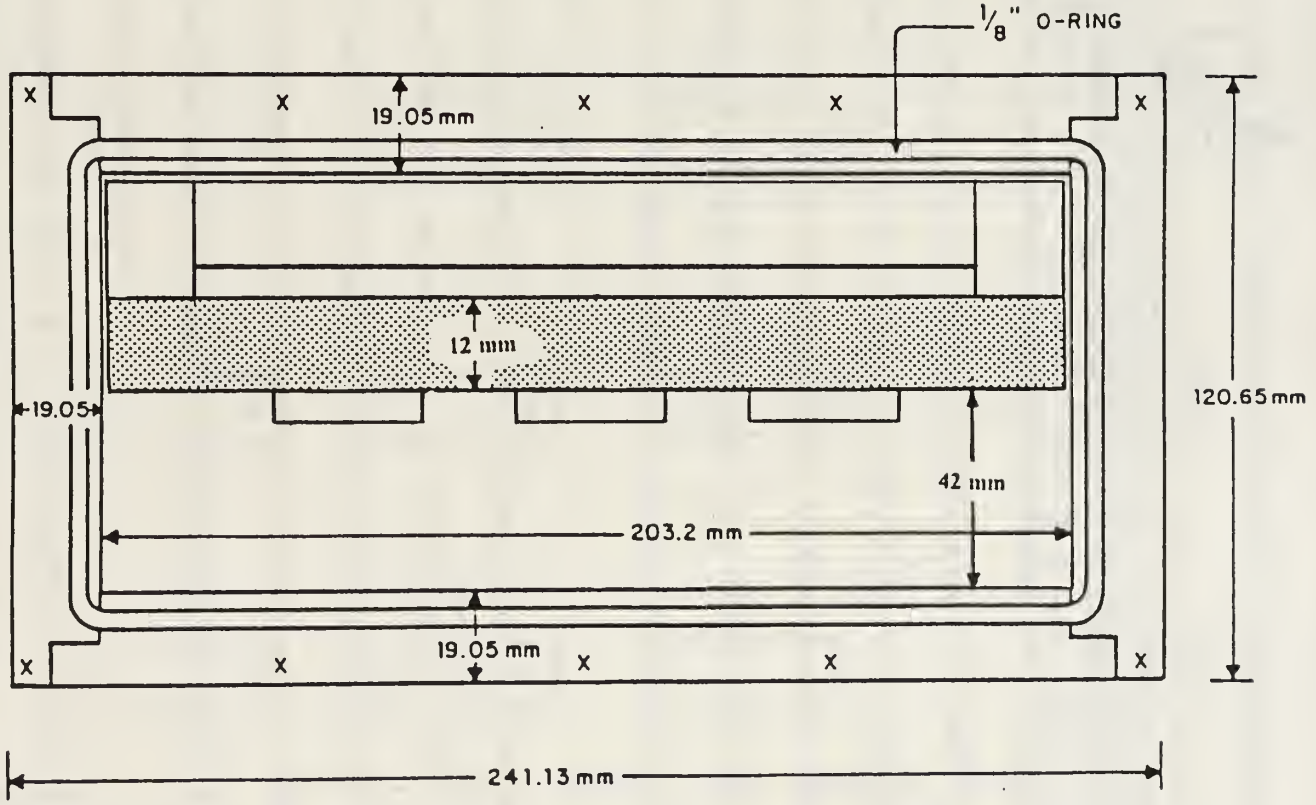

Figure 2.1. Top View of the Chamber and Circuit Board

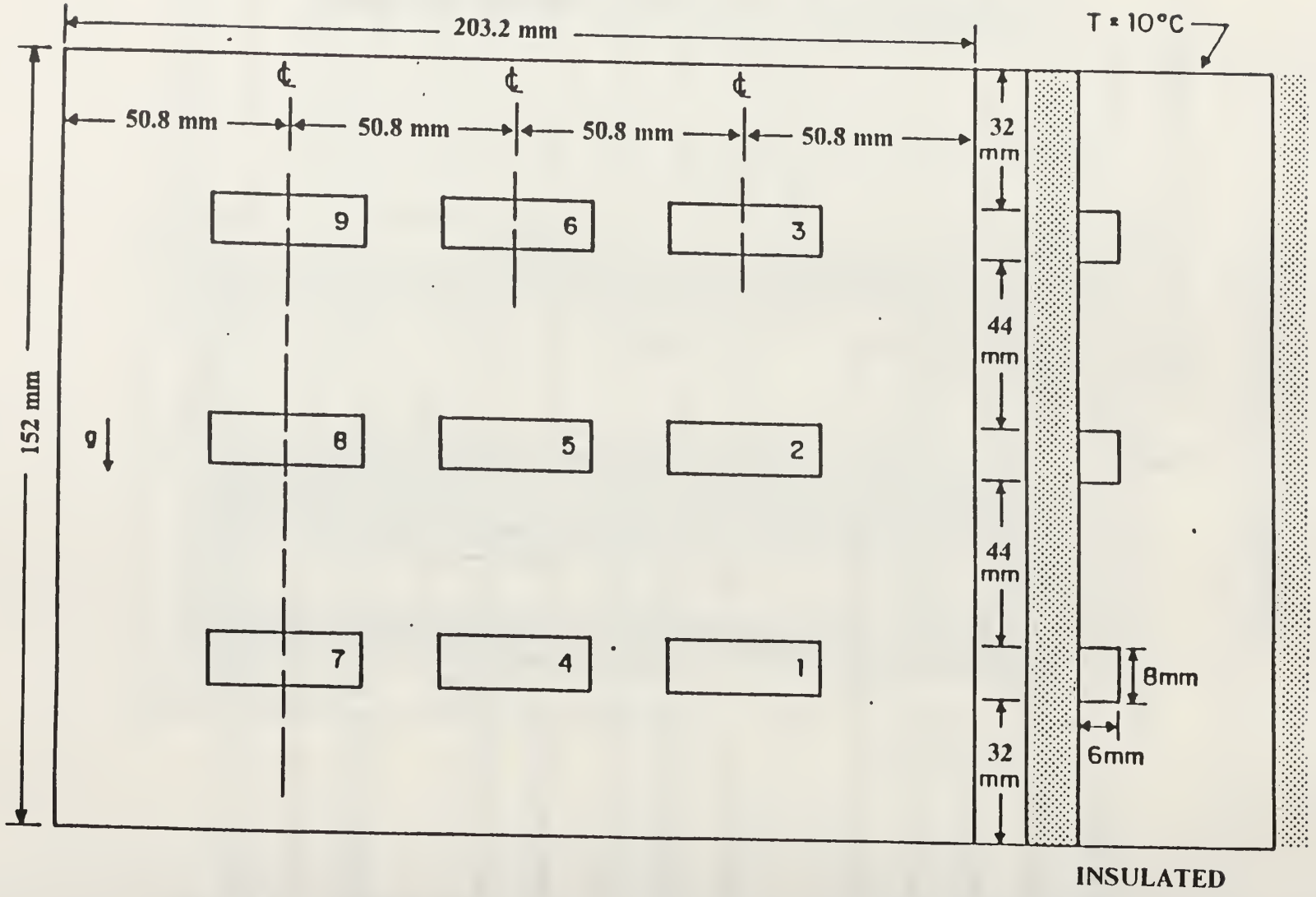

Figure 2.2. Simulated Circuit Board with Horizontally Placed Components

B. DESCRIPTION OF THE HARDWARE AND DESIGNING THE CIRCUIT BOARD

The chamber was made of 19.05 mm thick plexiglass with external dimensions of 241.13 x 152.0 x 120.65 mm. Some minor modifications were done on the chamber. The location of the steel tubings were changed in order to allow the chamber to be filled with dielectric liquids at any chamber width. The bottom heat exchanger was replaced by 12 mm thick plexiglass wall to have insulated bottom boundary condition. The external walls of the top heat exchanger were made of plexiglass. On 3 mm thick internal aluminum wall allowing almost isothermal top boundary conditions to the chamber, six thermocouples were placed symmetrically along the plate length and width. This modification was done to enable calculation of the average temperature of the top boundary, no matter what the spacing was.

The circuit board was fixed in the chamber allowing the maximum obtainable spacing of 42 mm. Two 12 mm and two 6 mm thick plexiglass spacers (152 x 203.2 mm) were used to change spacing between the circuit board and front wall of the chamber. Spacers were placed in the chamber by removing the bottom wall of the chamber. The spacings of 42 mm, 30 mm, 18 mm and 11 mm are obtainable by using these spacers.

The components were 24 x 8 x 6 mm aluminum blocks to simulate approximately a 20-pin-dual-in-line-package. Aluminum blocks were provided a nearly uniform heat flux by attaching foil heaters to the base. The approximate

resistance of the heaters was 10.3 ohms. These heaters were connected in series with 2 Ω ± 2.5% resistors to calculate the power dissipation on each heater. (See data analysis.)

Temperatures on the component surfaces were measured using 3 mil copper-constantan thermocouples. They were manufactured by using an arc welder. During the manufacturing process, current and time setting were kept at a minimum and the argon gas pressure was less than 5 psig. Due to the extremely small diameter of the copper and constantan, and in order not to loose strength between the bead and insulation, bare parts were kept as small as possible. Then, the bare parts except for the bead were insulated by means of electrical varnish. This process made it easier to handle the thermocouples during and after tack-welding them to the aluminum blocks.

In order to reduce the unknown contact resistance between the block surfaces and thermocouple beads, thermocouples were tack-welded to the wells machined on the blocks. (See Figure 2.3 after Benedict, 1988.) A small table vise was modified by replacing the steel jaws with copper. This prevented the blocks from being deformed and introduced lesser electrical resistance to the conduction path of the machine. During tack-welding process power rate was kept between 16-20 W/sec. Not more than two thermocouples were welded to the blocks, one at a time, because of the very brittle property of the wires after welding even under their own weight. The rest of the wells were filled with high thermal conductivity epoxy (Omega bond 101). Besides filling up the grooves it made the block easier

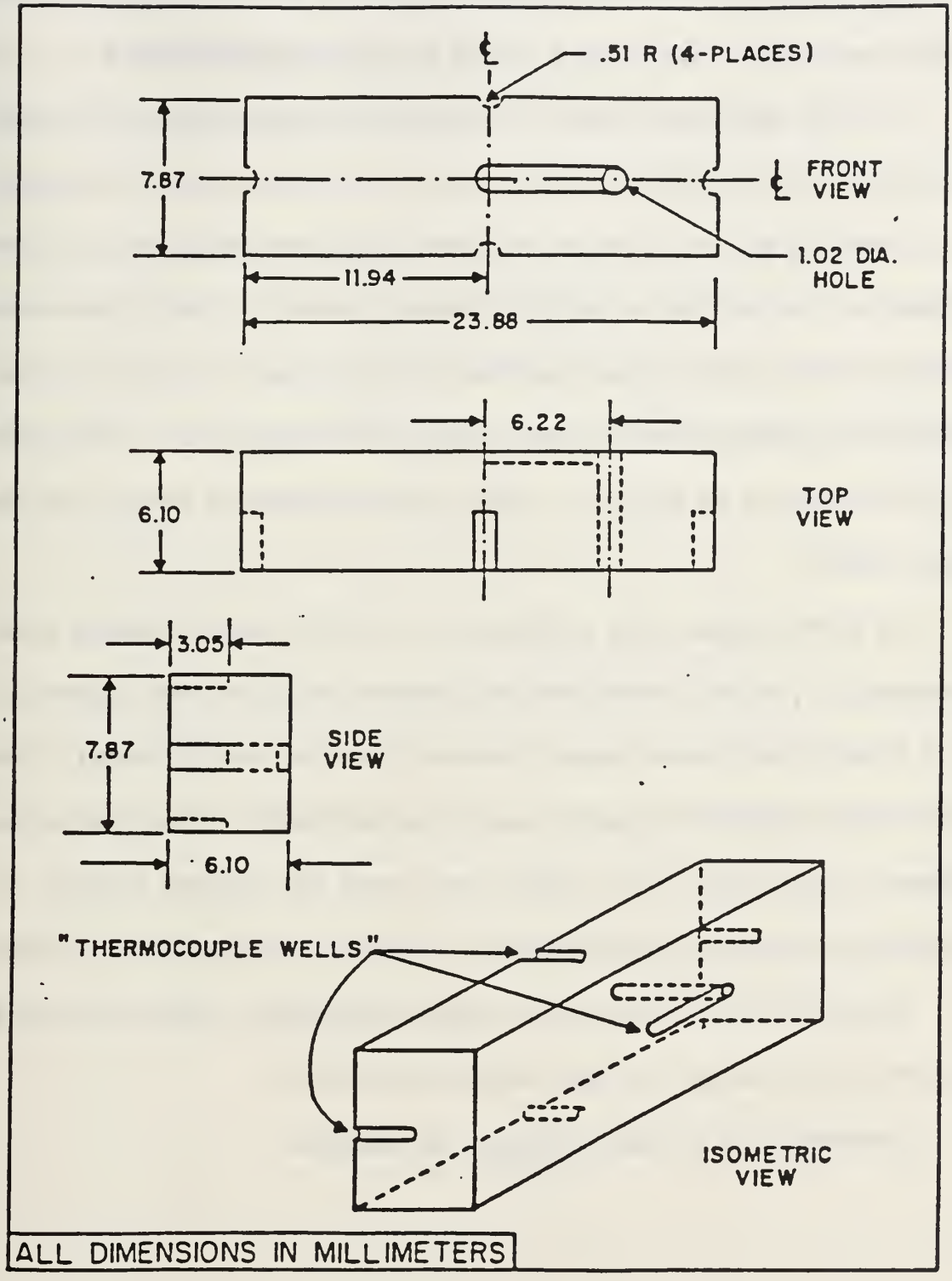

Figure 2.3. Aluminum Block and Thermocouple Location.

to handle. The same method as in measuring the front surface temperatures of the blocks was used to read the back surface temperatures of the blocks.

The next step was bonding the heaters in the grooves of 0.5 mm depth machined on the circuit board. This was done with adhesive epoxy (Omega bond 100), ensuring that the holes on the heater and plexiglass circuit board were aligned and not blocked by bonding material. Inserting the thermocouple wires attached to the blocks through the holes and making sure of proper alignment, blocks were bonded onto the heaters by means of Omega bond 101. Filling up the rest of the holes at the back of the circuit board completed the design of the new circuit board.

All thermocouples were connected to a HP-3497 data acquisition system controlled by a HP-9826 microcomputer. Power to the heaters was supplied by a 0-10 V and 0-5 A DC power supply. Channel 61 and channels 62 through 70 were connected in parallel to the power supply output and heaters. This connection then allowed measurement of the voltage drop across the precision resistors. The numbering scheme on both data acquisition system and hardware was as follows:

Channels 0 to 53: Component surface temperatures starting from chip #1 with the order of center, top, right, left, bottom and back.

Channels 54 to 56: Heat exchanger temperatures.

Channels 57 to 60 and 71 to 75: Back circuit board temperatures which allow calculation of the conduction loss.

Channel 76: Ambient temperature.

III. EXPERIMENTAL PROCEDURE

A. HARDWARE PREPARATION

Upon assembling the hardware (see Figure 3.1 after Benedict, 1988), each channel on the HP-3497 data acquisition system were scanned to verify that all nine components were equally powered and all thermocouples were operating properly. Then, the following procedure was used for each chamber width:

1. Spacing of the chamber was adjusted by removing the bottom wall of the chamber and sliding the required spacers into the chamber.
2. Constant temperature bath was energized to verify there was no external and internal leakage.
3. Chamber was filled with dielectric liquid by ensuring no air bubbles were left in it.
4. The desired power level was applied to the components by adjusting the current dial on power supply.
5. As power level increased, the dial on constant temperature bath was adjusted subsequently in order to keep the average top boundary temperature at 10°C.

B. DATA ACQUISITION

Data were recorded when steady state conditions were reached. It took approximately 4-5 hours to reach the steady state depending upon the dielectric and spacing. Since the magnitude of the fluctuations (from peak to valley) at

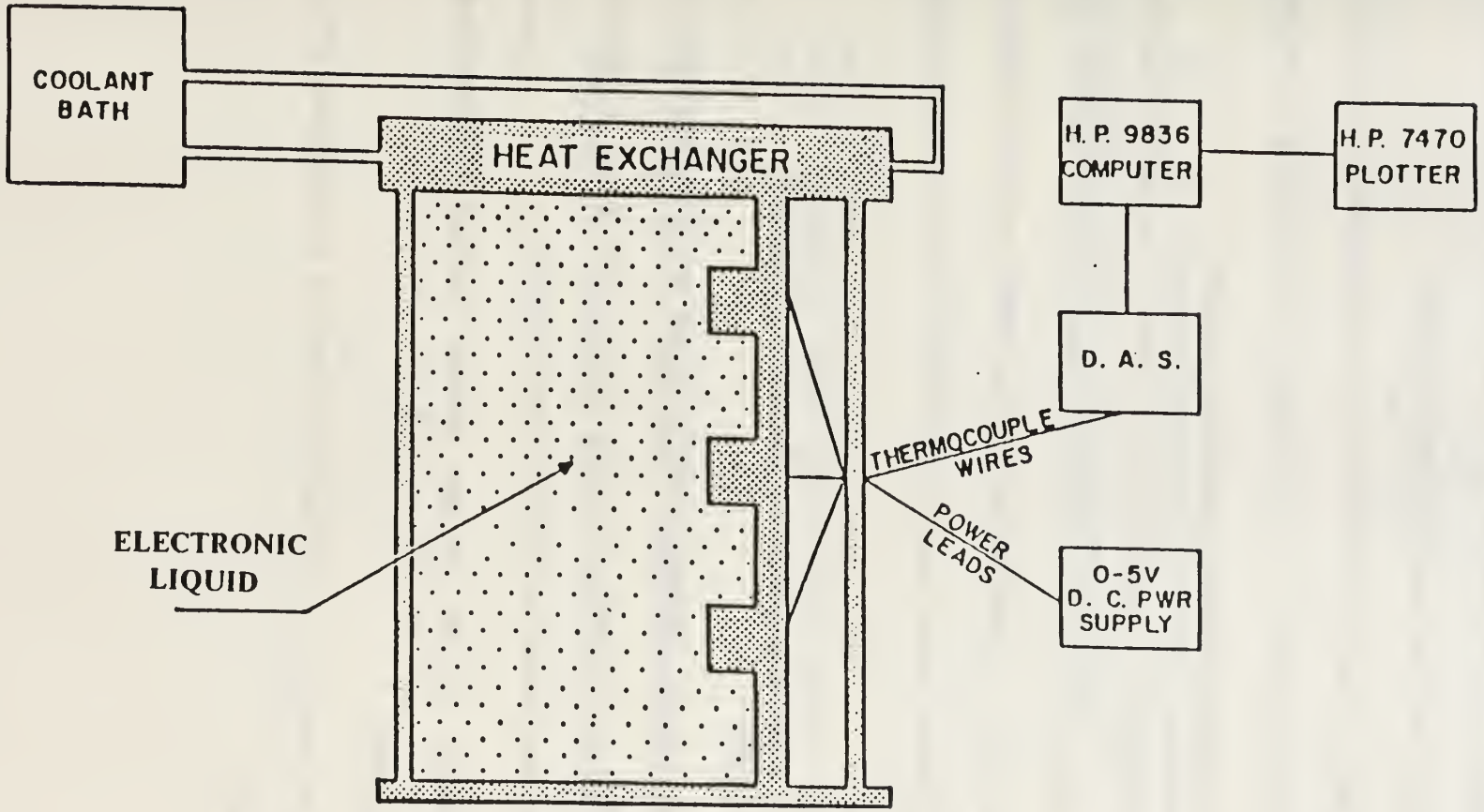

Figure 3.1. Schematic of Entire Assembly

steady state changed with the location of the component in the chamber and spacing, steady state conditions were defined separately.

When a majority of the temperatures were fluctuating less than 0.4° C (for dielectric FC-43) and less than 1.0° C (for dielectric FC-75) during 4-5 separate runs with 5-10 minute intervals, steady state was assumed.

Raw *emf* readings were recorded and analyzed by the software programs ACQUIRE, CALCDIEL, FASTSCAN and PLOT. These programs were the same as used by Pamuk (1987), Benedict (1988), Torres (1988), and Powell (1989) with some minor modifications to take care of the changing channel numbering scheme and dielectric fluid.

C. DATA ANALYSIS

Data was analyzed in following fashion to get the non-dimensional heat transfer parameters (*Nu1, Nu2,* Ra_f, Ra_l) of the entire array at prescribed conditions. These parameters are defined in nomenclature.

1. Calculation of the Average Wetted Surface Temperature of Component.

Upon converting the thermocouple *emf*s to temperatures (°C) (See sample calculations)

$$T_{avg} = \frac{\sum_{i=1}^{5} A_i T_i}{A_{total}} \quad (1)$$

where,

A_i, T_i ≡ Area and temperature of the i^{th} surface
A_{total} ≡ Total wetted surface area of the component.

2. Calculation of the Power Dissipated by Heater

$$Power = emf\,(volt - emf) / R_p \quad (2)$$

where,

volt ≡ Power supply voltage (Channel 61)
emf ≡ Voltage across the heaters (Channels 62 to 70)
R_p ≡ Resistance of precision resistors connected in series to the heaters (2 Ω ± 2.5%).

3. Calculation of the Conduction Loss Through the Circuit Board

Assuming 1-D conduction through the back surface area of the components

$$Q_{loss} = \frac{\sum_{n=1}^{9} (\Delta T_n / R_c)}{9} \quad (3)$$

$$R_c = t / k_p A \quad (4)$$

$$\Delta T = T_{cb} - T_{bp} \quad (5)$$

where,

R_c ≡ Conductive resistance of the plexiglass
T_{cb} ≡ Component back surface temperatures
T_{bp} ≡ Back circuit board temperatures
t ≡ Thickness of the circuit board (Length of the conduction path)
k_p ≡ Thermal conductivity of the plexiglass
A ≡ Back surface area of the component.

4. Calculation of the Heat Transfer Coefficient

Average heat transfer coefficient around the wetted surface of the component was defined as:

$$h = \frac{Q_{net}}{A_{total}(T_{avg} - T_{sink})} \quad (6)$$

$$Q_{net} = Power - Q_{loss} \quad (7)$$

$$T_{sink} = \frac{T(54) + T(55) + T(56)}{3} \quad (8)$$

where,

Q_{net} ≡ Net power dissipated by the heater
T_{sink} ≡ Average temperature of the heat exchanger, i.e., top boundary temperature of the chamber (Channels 54, 55, and 56 on hardware).

5. Calculation of the Thermophysical Properties of the Dielectrics

Functional relationships between the thermophysical properties and the film temperatures are listed below, where film temperature was defined as:

$$T_{film} = (T_{avg} + T_{sink}) / 2 \quad (9)$$

a. Thermal Conductivity k(W/mK)

$$FC\text{-}75 \quad [0.65 - 7.8947E-4 * T_{film}] / 10 \quad (10)$$

$$FC\text{-}43 \quad [0.666 - 9.864E-5 * T_{film}] / 10 \quad (11)$$

b. Density ρ(kg/m³)

$$FC\text{-}75 \quad [1.825 - 0.00246 * T_{film}] * 1000 \quad (12)$$

$$FC\text{-}43 \quad [1.913 - 0.00218 * T_{film}] * 1000 \quad (13)$$

c. Specific Heat C_p (J/kg K)

For all dielectrics

$$[0.241111 + 3.7037E-4 * T_{film}] * 4180 \quad (14)$$

d. Kinematic viscosity ν(m²/s)

$$FC\text{-}75 \quad \begin{aligned}[1.4074 - 2.964E-2 * T_{film} + 3.8018E-4 * T_{film}^2 \\ - 2.7308E-6 * T_{film}^3 + 8.1679E-9 * T_{film}^4] * E^{-6}\end{aligned} \quad (15)$$

$$FC\text{-}43 \quad \begin{aligned}&[8.8750 - 0.47007 * T_{film} + 1.387E-2 * T_{film}^2 \\ &- 2.1469E-4 * T_{film}^3 + 1.3139E-6 * T_{film}^4] * E^{-6}\end{aligned} \tag{16}$$

e. Thermal Expansion Coefficient β (K^{-1})

$$FC\text{-}75 \quad [0.00246 / (1.825 - 0.00246 * T_{film})] \tag{17}$$

$$FC\text{-}43 \quad [0.00218 / (1.913 - 0.00218 * T_{film})] \tag{18}$$

f. Thermal Diffusivity α (m^2/s)

$$\alpha = k / (\rho C_p) \tag{19}$$

6. Calculation of the Nusselt Numbers

a. Nusselt Number Based on the Height of the Component

$$Nu1 = h * L1 / k_f \tag{20}$$

where,

$L1$ ≡ Height of the components in the direction of the gravity vector

k_f ≡ Thermal conductivity of the dielectric fluid at film temperature.

b. *Nusselt Number Based on the Ratio (Area/Perimeter) of the Component*

$$Nu2 = h * L2 / k_f \tag{21}$$

$$L2 = \sum_{i=1}^{5} (A_i / P_i) \tag{22}$$

where,

A_i, P_i ≡ Area and the perimeter of the i^{th} surface of the component.

7. Calculation of the Grashof Number

Grashof Number in this study was defined as,

$$Gr = (g \beta L^3 \Delta T) / \nu^2 \tag{23}$$

where,

$$\Delta T = T_{avg} - T_{sink} \tag{24}$$

g ≡ Gravitational acceleration

8. Calculation of the Prandtl Number

$$Pr = \nu / \alpha \tag{25}$$

9. Calculation of the Rayleigh Numbers

a. *Temperature Based Rayleigh Number*

$$Ra_t = Gr\,Pr \tag{26}$$

b. Flux Based Rayleigh Number

$$Ra_f = g \beta L^4 Q_{net} / (k_f \nu \alpha A_{total}) \quad \textbf{(27)}$$

The above procedure was repeated for each component.

IV. RESULTS AND DISCUSSION

A. HEAT TRANSFER MEASUREMENTS

Heat transfer measurements were done in the power level range of 0.115 W to 2.9 W per component to examine the effect of chamber width (i.e., spacing) on heat transfer parameters of the components. Two dielectric liquids, FC-75 and FC-43, were used. Five different spacings from maximum obtainable with the available chamber to minimum were applied to the chamber for each liquid. These spacings were 42 mm, 30 mm, 18 mm, 11 mm and 7 mm. During the experiments top and bottom boundary conditions were kept constant at 10°C and insulated respectively.

Component surface temperatures and nondimensional heat transfer parameters were both tabulated and plotted. Array-averaged component temperatures and nondimensional parameters (i.e., $Nu1$ and Ra_l) of the entire array were also plotted for each fluid to present the effect of spacing in both dimensional and nondimensional terms.

Due to the similar behavior of the components on the same row, correlation formulas which relate the row-averaged and array-averaged $Nu1$ and Ra_l were obtained in the form of $Nu1 = a\ Ra_l^b$, where a and b are constant.

In the case of FC-75 and spacings of 30 mm and 7 mm, and in the case of FC-43 and spacing of 7 mm, surface temperature fluctuations of Channel 0 (i.e., Chip #1 front surface temperature), 12 (i.e., Chip #3 front surface temperature), 31

(i.e., Chip #6 top surface temperature) were recorded at steady state for a period of 200 sec.

1. Results for FC-75

Surface temperature measurements and nondimensional form of the data in terms of Ra_t, Ra_f, Nu1 and Nu2 for each spacing are presented in Tables 1 through 35 in Appendix C.

For the graphical representation of the results, two sets of plots were generated. The first set from Figure 4.1 to 4.5 represents the heat transfer behavior of the components in nondimensional terms (i.e., Ra_f vs. Nu1). The second set represents the averaged behavior of the entire array in both temperature (Figure 4.6) and nondimensional terms (Figure 4.7).

As is seen from the first set, the data reveal almost a single slope in the range $10^7 < Ra_f < 2 * 10^8$. The data obtained at the lowest power level tended to deviate from this behavior. The maximum spread in magnitude of Rayleigh numbers of the components at a power setting of 2.9 W and 7 mm spacing was less than 7% of the highest Ra_f. The maximum deviation in Nusselt numbers (*Nu1*) of the components was met at Rayleigh number of $1.8 * 10^8$ for the spacings of 42 mm and 30 mm. The magnitude of the maximum deviation from the array-averaged *Nu1* was ±1.45 (i.e., ±7%) which corresponds to 6°C temperature difference between the components having maximum and minimum average temperatures. Deviation from the array averaged *Nu1* was less than ±0.5 for other spacings (i.e., 18 mm, 11 mm, 7 mm).

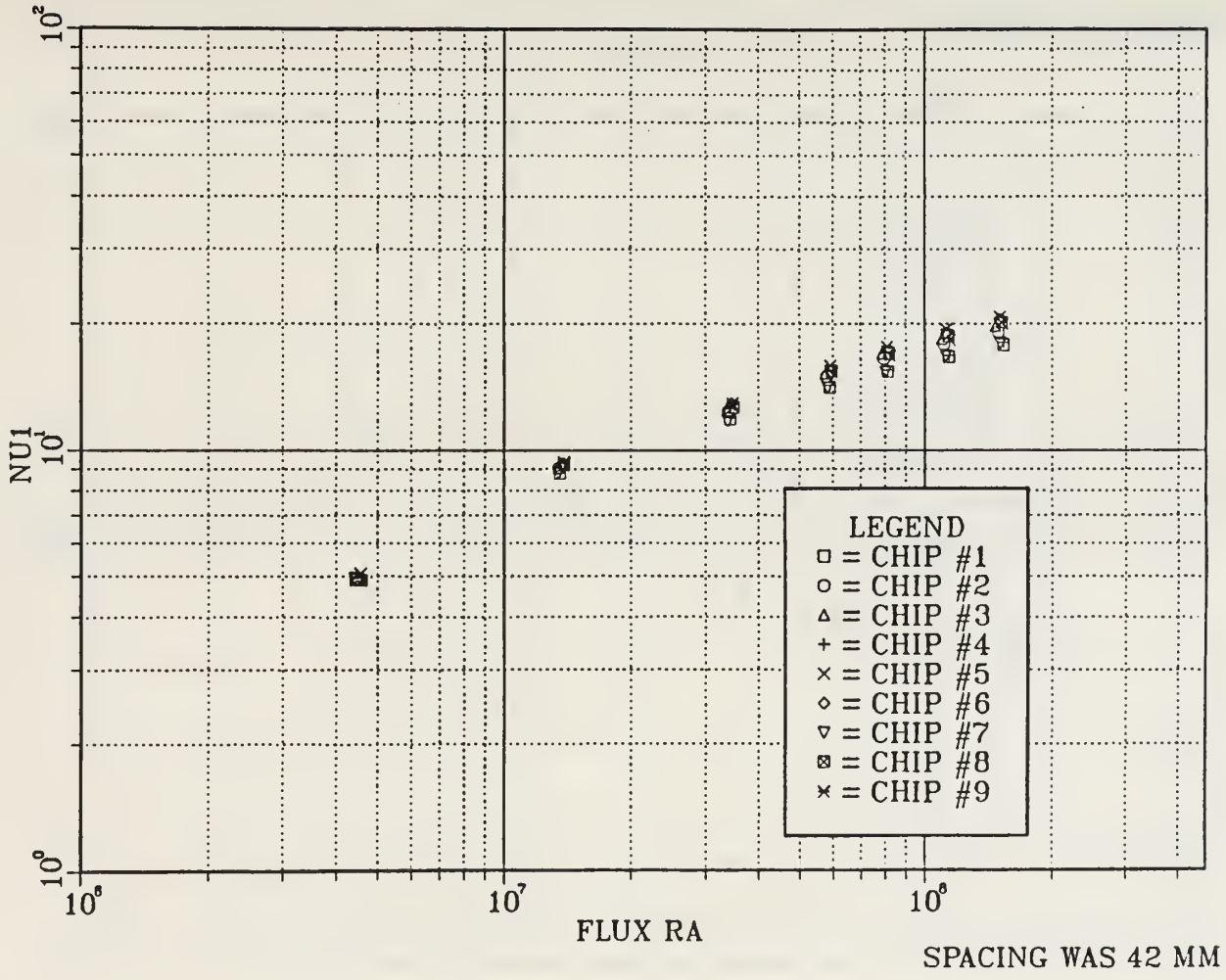

Figure 4.1. Plot of Nu1 vs. Ra, for FC-75 and 42 mm Spacing

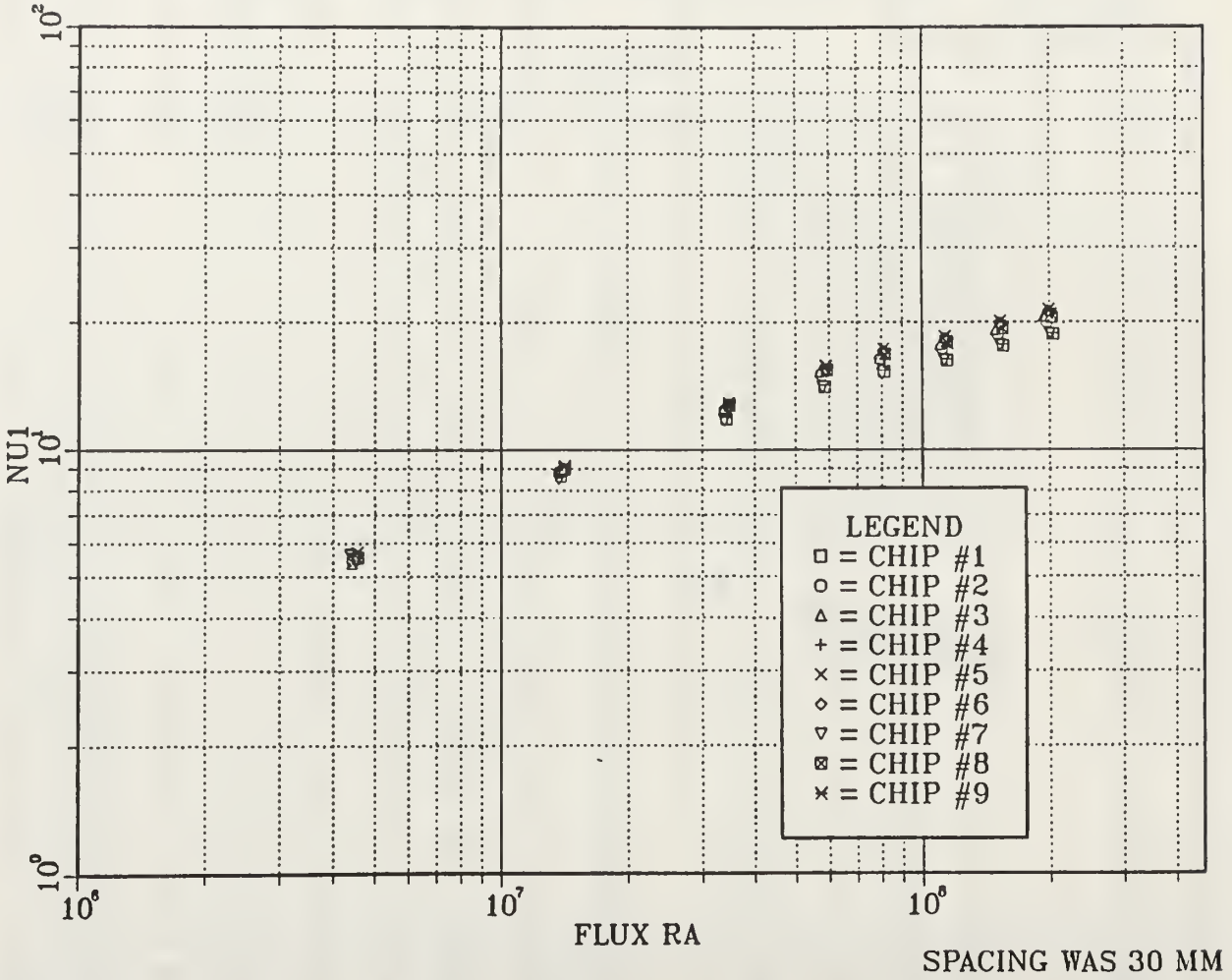

Figure 4.2. Plot of Nu1 vs. Ra_f for FC-75 and 30 mm Spacing

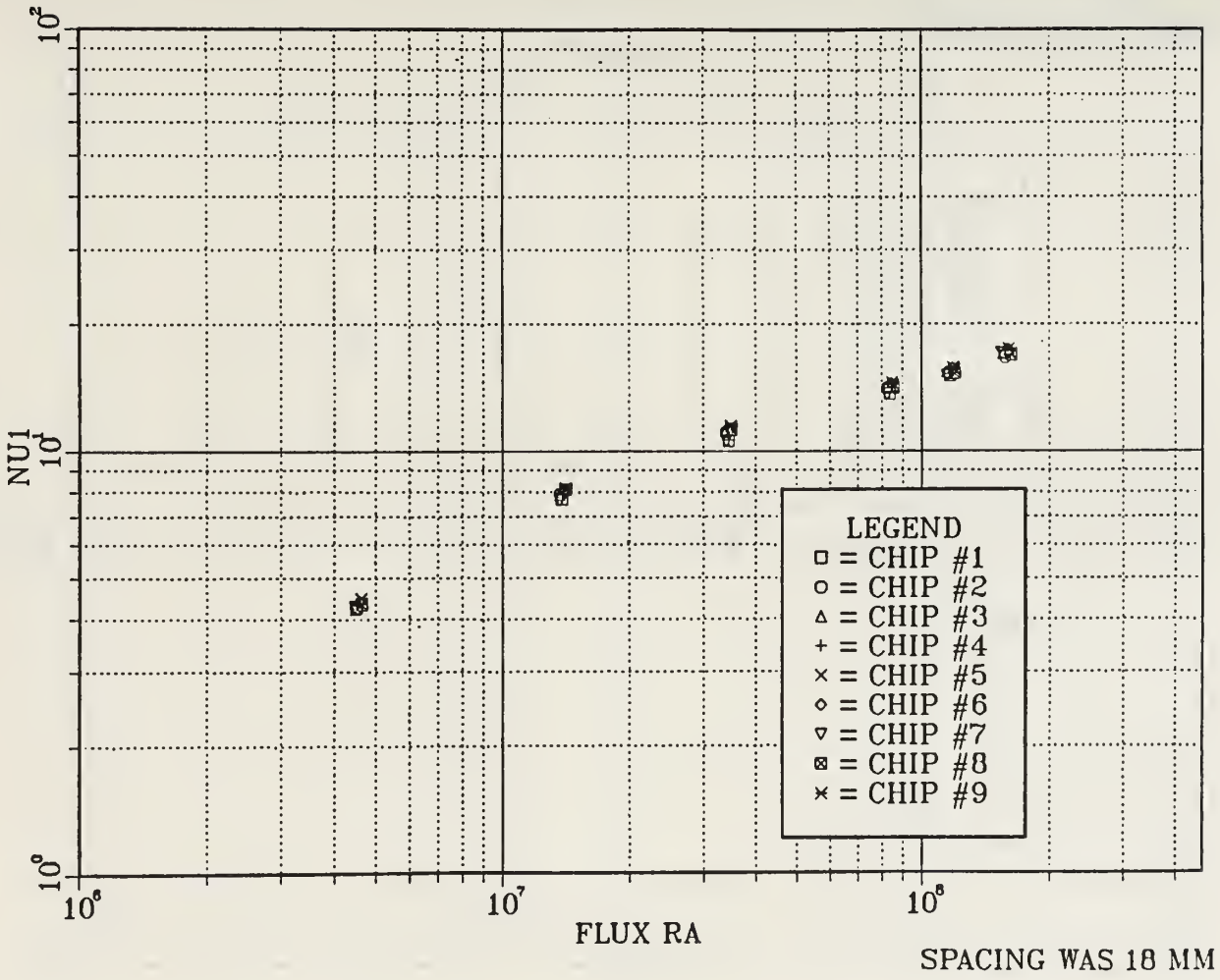

Figure 4.3. Plot of Nu1 vs. Ra_t for FC-75 and 18 mm Spacing

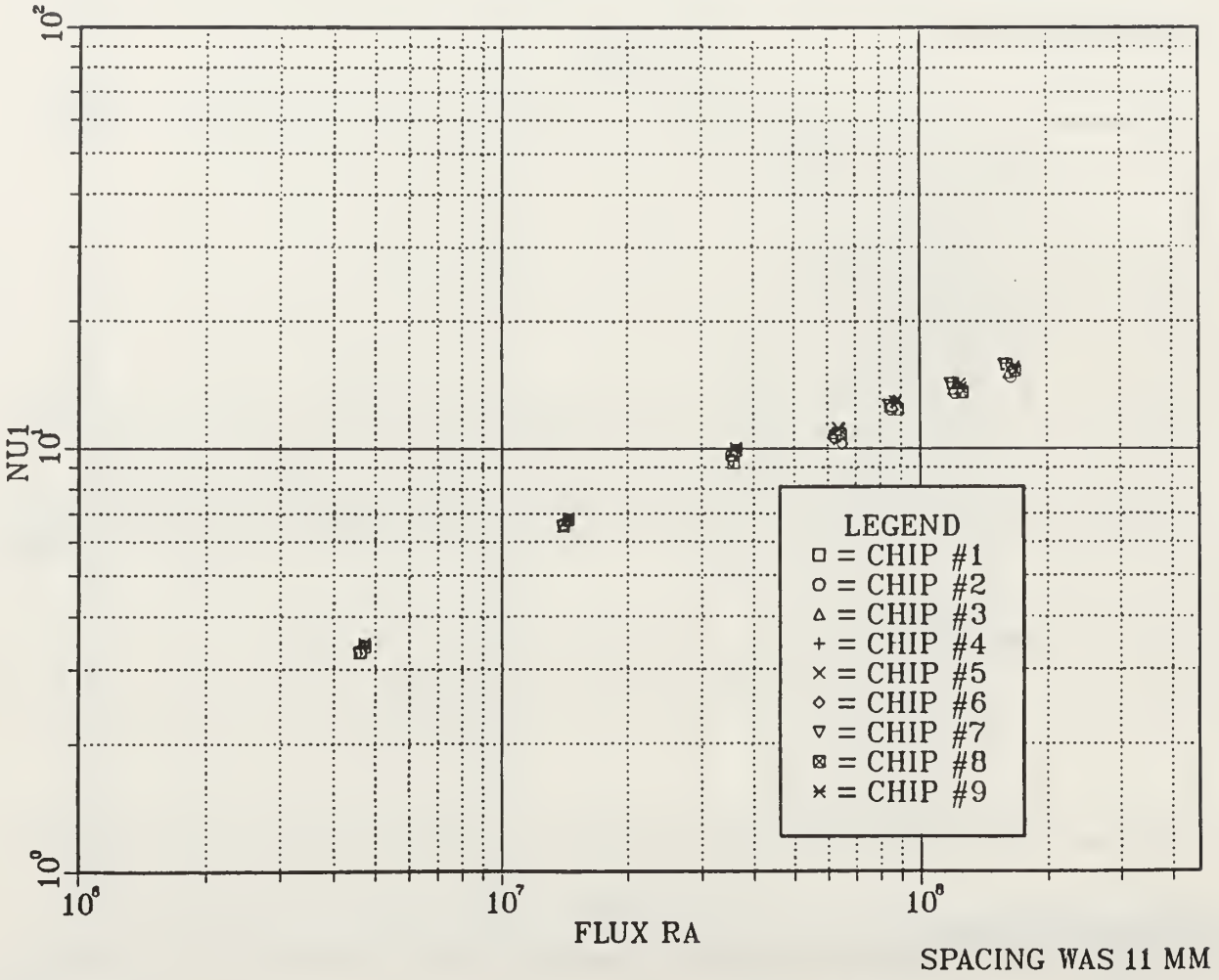

Figure 4.4. Plot of Nu1 vs. Ra_t for FC-75 and 11 mm spacing

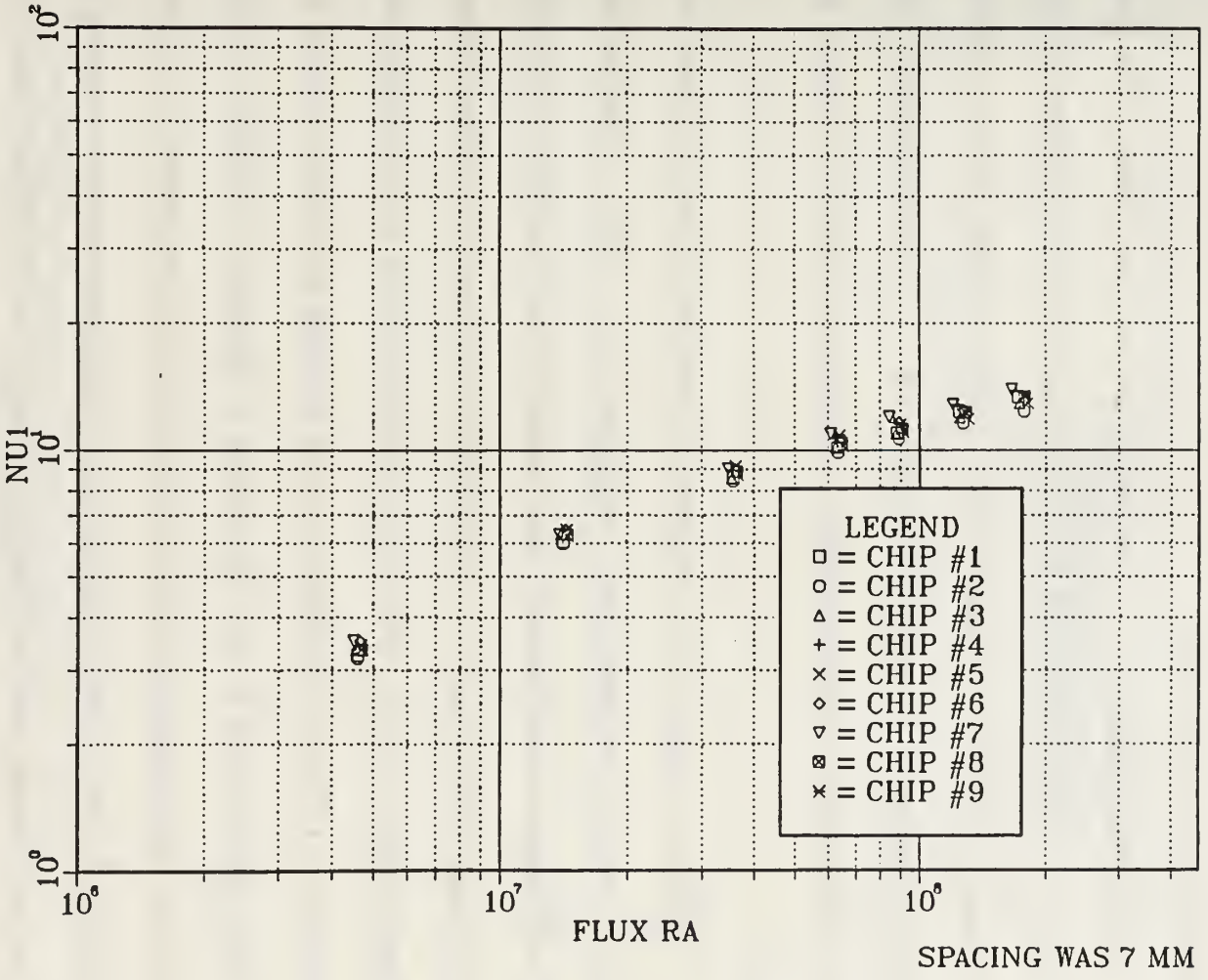

Figure 4.5. Plot of Nu1 vs. Ra, for FC-75 and 7 mm spacing

Due to similar behaviors of the components in the array, array-averaged plots in both nondimensional (Ra_f vs. $Nu1$) and dimensional terms were generated. These plots then allowed discussion of the effect of spacing on heat transfer characteristics of the entire array.

Reviewing Figure 4.7, an interesting phenomena arises in the range $10^7 < Ra_f < 2 * 10^8$. In this Rayleigh Number range data points indicate almost a constant slope regardless of spacing. The slopes of best fit lines obtained excluding the data points at Rayleigh Number of $4.5 * 10^6$ were between 0.296 and 0.340. This behavior then allowed the correlation of the effect of spacing (see section 5).

Reviewing Figure 4.6, a decrease in spacing caused an increase in component average temperatures throughout the array. Array-averaged temperature increase reveal almost a single slope for each spacing, but it became steeper as spacing decreases. The magnitude of temperature increase between the chamber widths of 42 mm and 7 mm was almost 3°C at 0.115 W power level. It increased up to 15°C at 2.9 W power level. A possible explanation may be that, at low power levels there is very little effect of decrease in spacing on weak circulating flow, so boundary conditions of the chamber dominates the heat transfer characteristics. At high power levels, decrease in spacing disturbs the strong flow around the components and this affects the heat transfer characteristics. The temperature difference between the surfaces of the each individual components was not significant and it was less than 0.5°C during the experiments. The

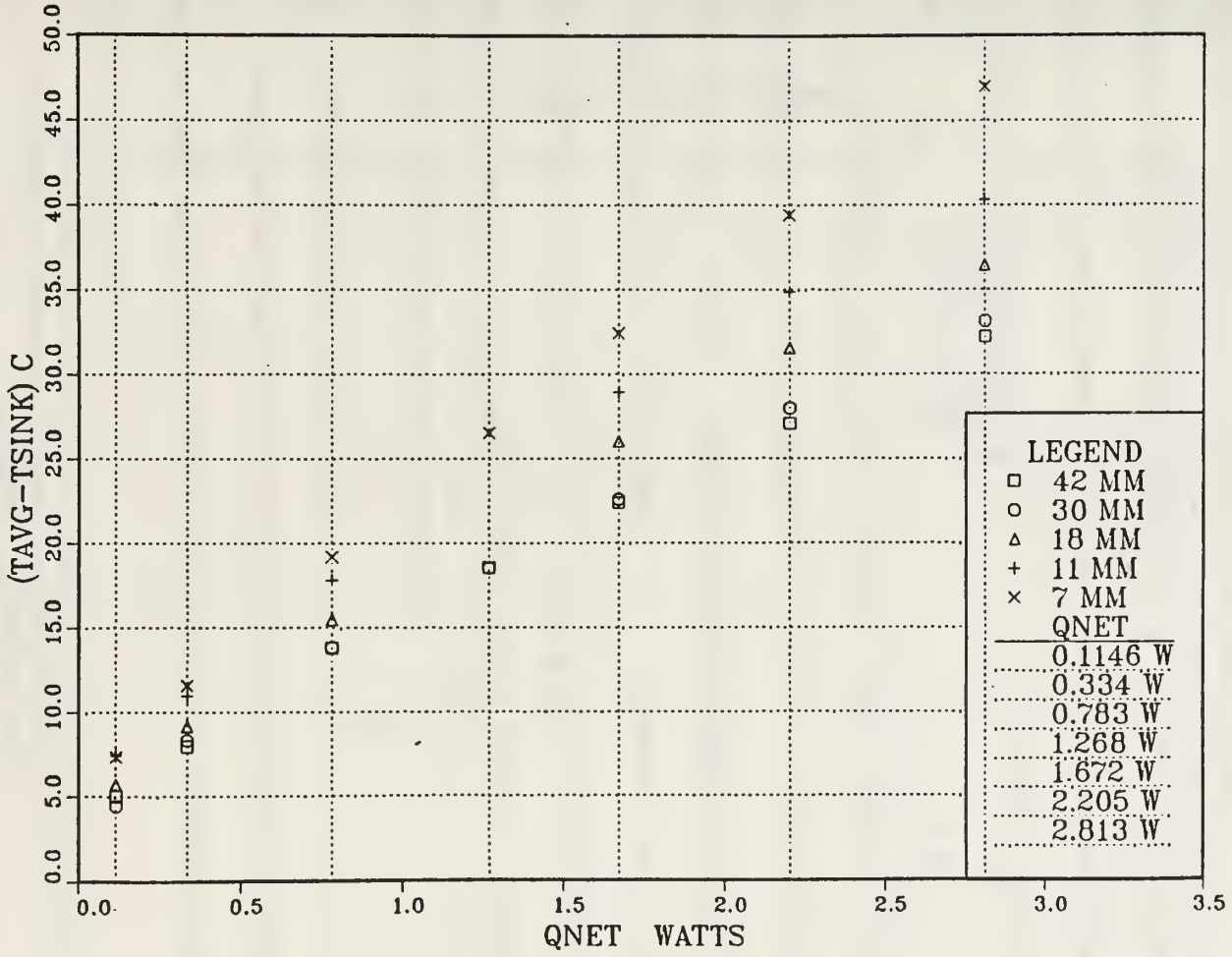

Figure 4.6. Plot of Array-averaged (T_{avg} - T_{sink}) vs. Q_{net} for FC-75 and all Spacings

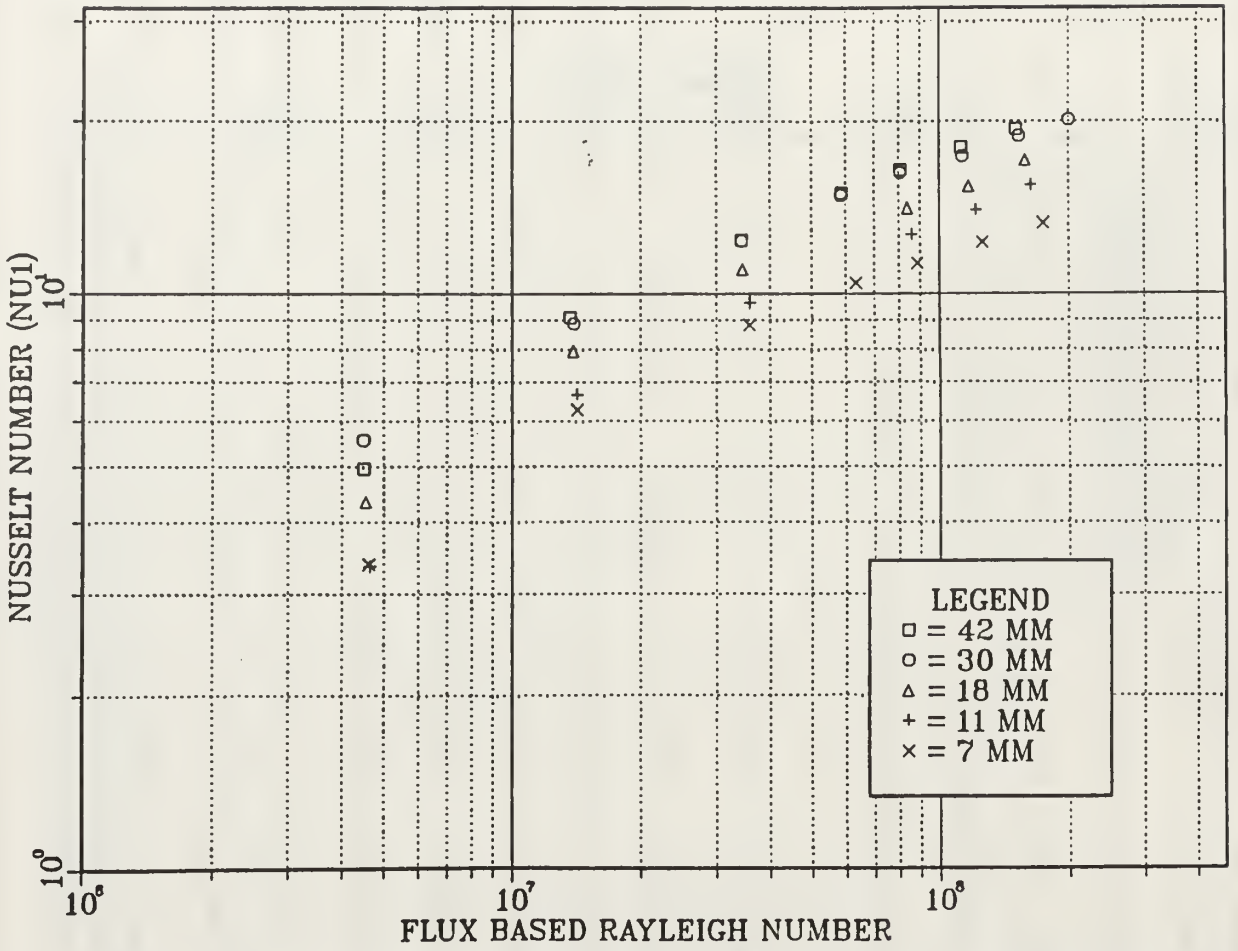

Figure 4.7. Plot of Array-averaged Nu1 vs. Ra_f for FC-75 and all Spacings

components in the same row behaved similarly in both temperature and nondimensional parameters except at the smaller spacings.

Mass flow rate of coolant through the effective width of the heat exchanger was decreased subsequently with decreasing spacing. This caused some increase between the coolant outlet and inlet temperature. As a result of that, the components in the column closer to the outlet of the heat exchanger had higher temperatures than the components in the same row but in the other two columns.

For the chamber widths of 42 mm and 30 mm, the order of increasing surface temperatures of the rows was bottom, middle, top. Up to power level of 2.25 W for 18 mm and 1.7 W for 11 and 7 mm, this trend did not change. After the power levels described above, the middle row components had the highest average temperatures and the bottom row components had the lower average temperatures. In any case, the maximum temperature difference between the components on different rows did not exceed 6°C.

2. Comparison with Earlier Data

Using dielectric fluid FC-75, setting the top and bottom boundaries to 10°C and insulated respectively, data for 30 mm chamber width were presented in Figure 4.2 as Ra_t vs. $Nu1$.

Averaged non-dimensional heat transfer parameters of the entire array for various power levels both from this study and that of Torres (1988) were plotted in Figure 4.8.

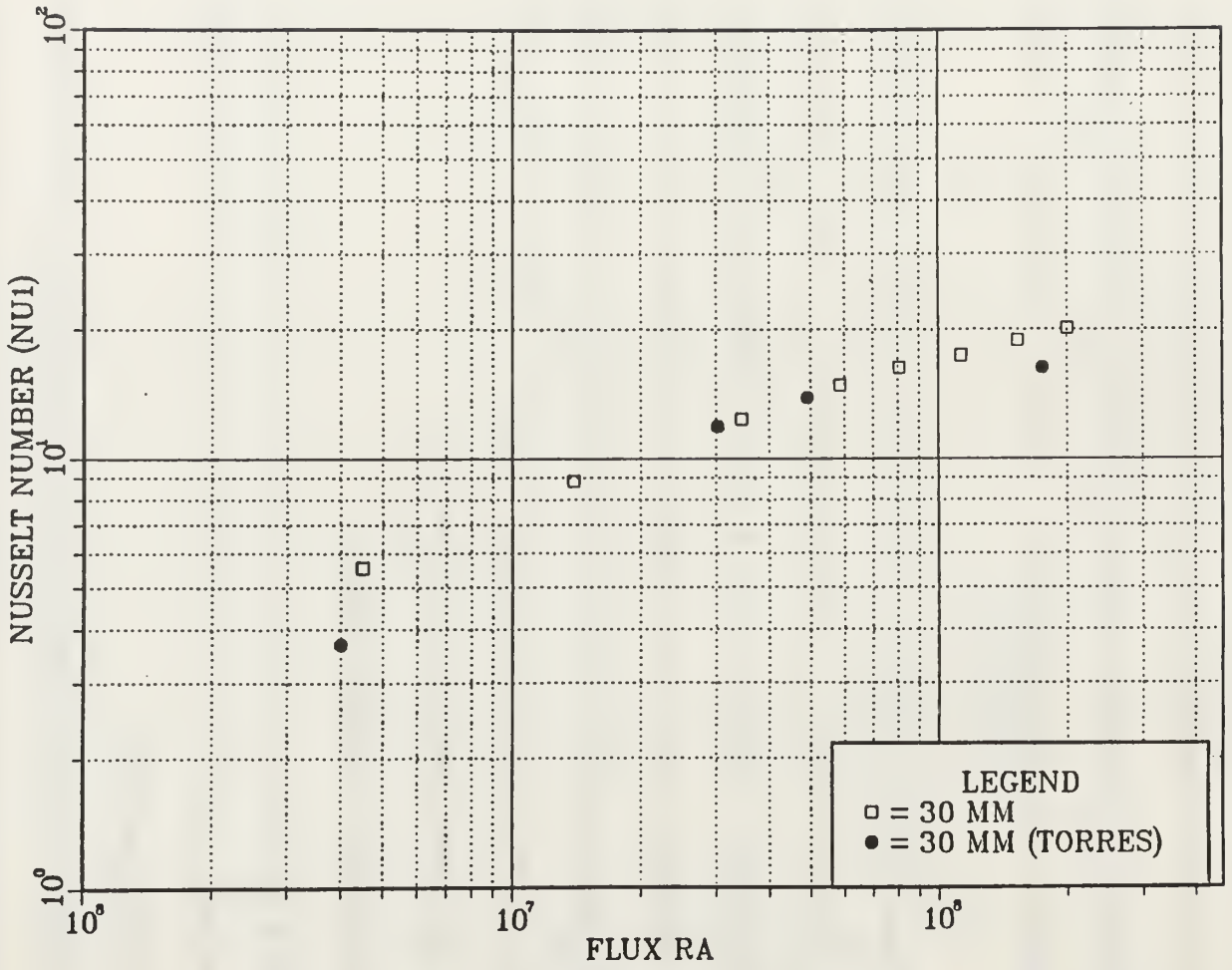

Figure 4.8. Plot of Array-averaged Nu1 vs. Ra_f From Both This Study and Torres (1988) for FC-75 and 30 mm Spacing

Comparing the results with Torres' data obtained with the same boundary conditions and chamber width but different spacing on component arrangement and smaller chamber dimensions, good agreement was found at the middle range power levels. At very high and very low power levels, Torres (1988) obtained smaller Nusselt numbers. This may be due to effect of the differences in the amount of the liquid in the two chambers.

3. Results for FC-43

Surface temperature measurements and Nusselt number versus Rayleigh number form of the data for each spacing are presented in Tables 36 through 69 in Appendix C.

Two sets of plots as in the FC-75 case were produced to present the data graphically.

The first observation as a result of high fluid Prandtl number was an increase in average component surface temperatures and decrease in Rayleigh numbers of the components.

Reviewing Figures 4.9 to 4.13, the data indicate almost a single slope except the one obtained at 0.115 W power level. This was the general trend of data which was experienced in the case of FC-75 and also in previous studies.

The maximum spread in magnitude of Rayleigh numbers was almost 12% of the highest Ra_f after the power level of 1.3 W for spacings of 11 and 7 mm. Maximum spread in magnitude of *Nu1* met at 2.9 W power level for 7 mm spacing was 1.51. The deviation from the array averaged *Nu1* was ±7% which

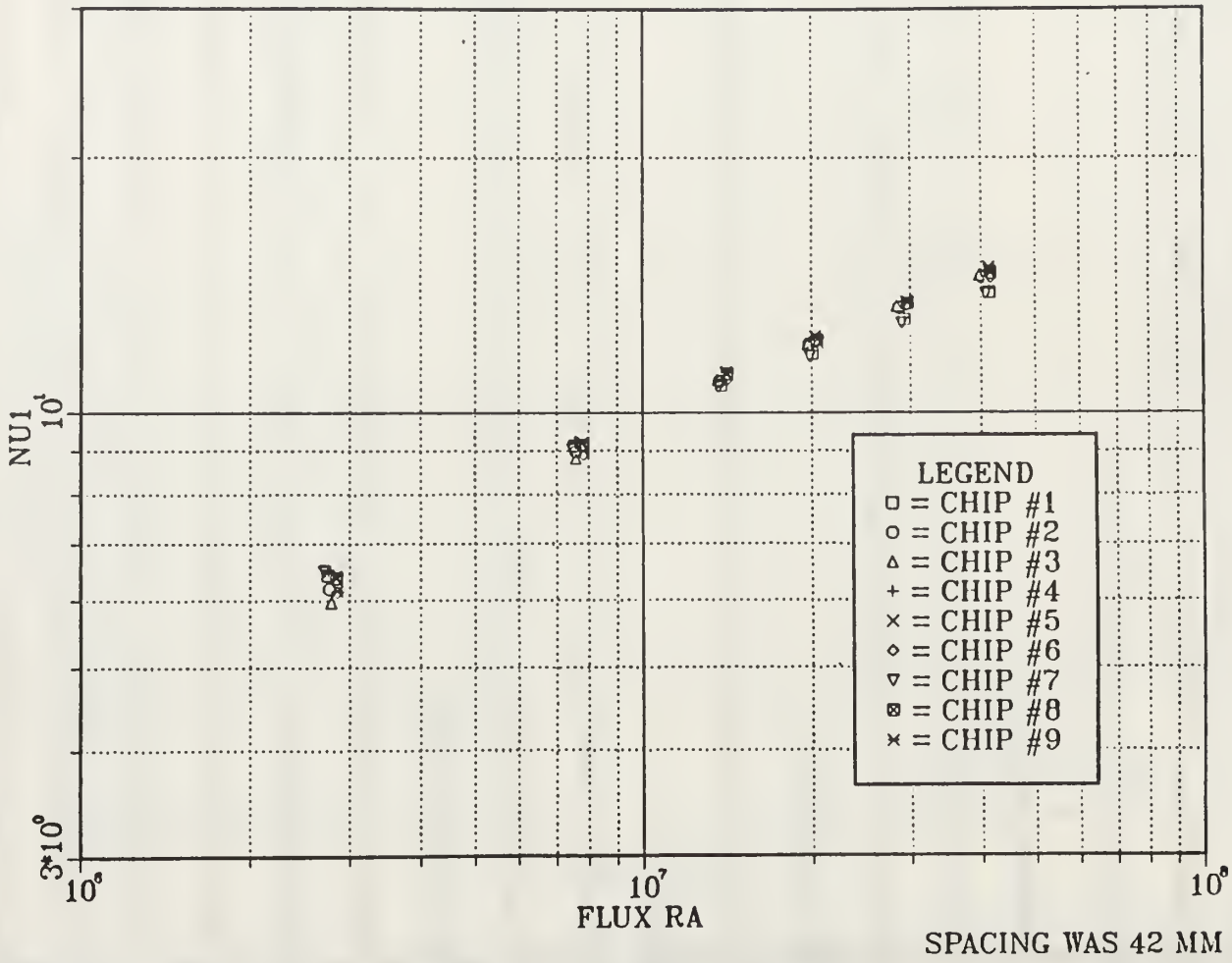

Figure 4.9. Plot of Nu1 vs. Ra_f for FC-43 and 42 mm Spacing

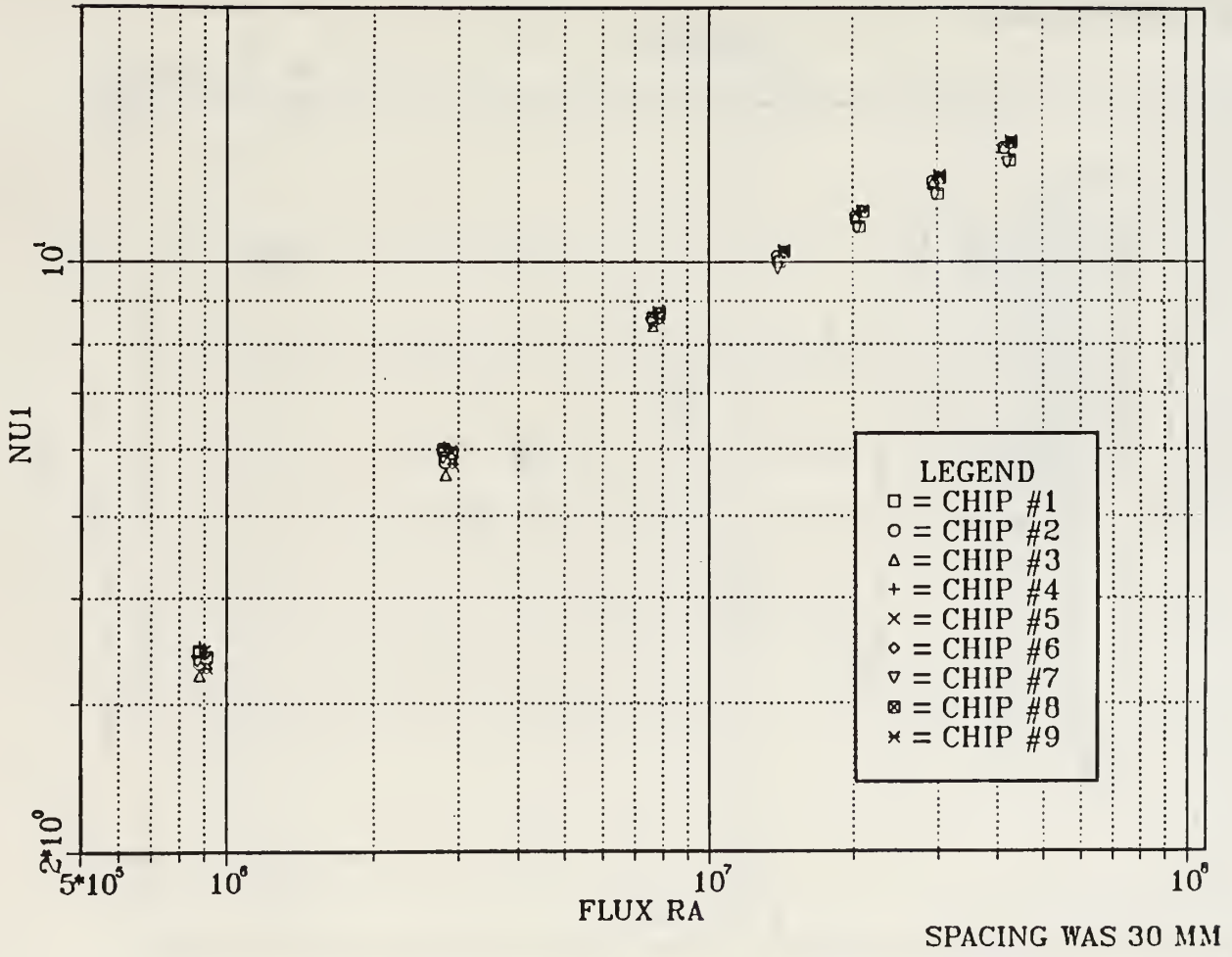

Figure 4.10. Plot of Nu1 vs. Ra, for FC-43 and 30 mm Spacing

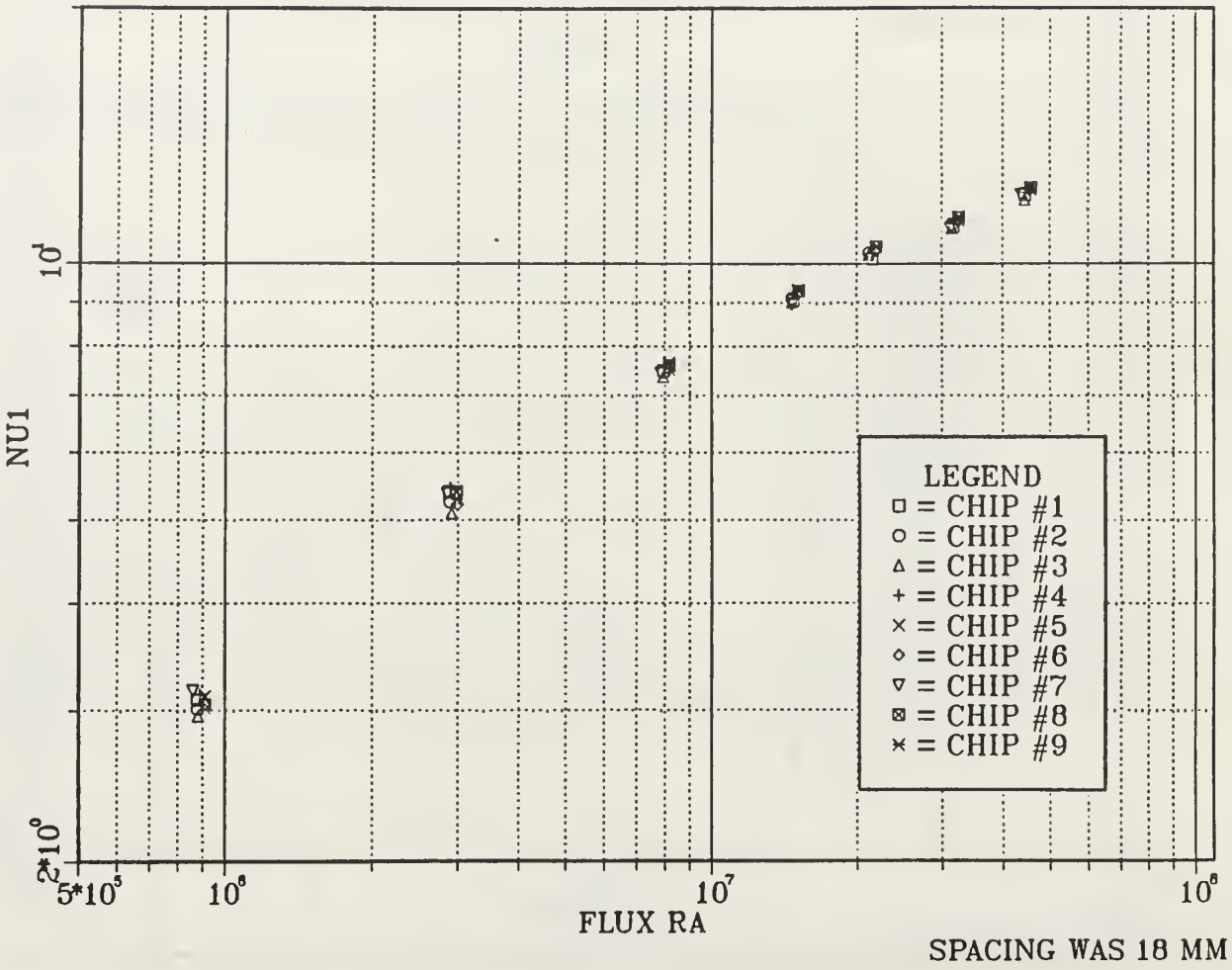

Figure 4.11. Plot of Nu1 vs. Ra, for FC-43 and 18 mm Spacing

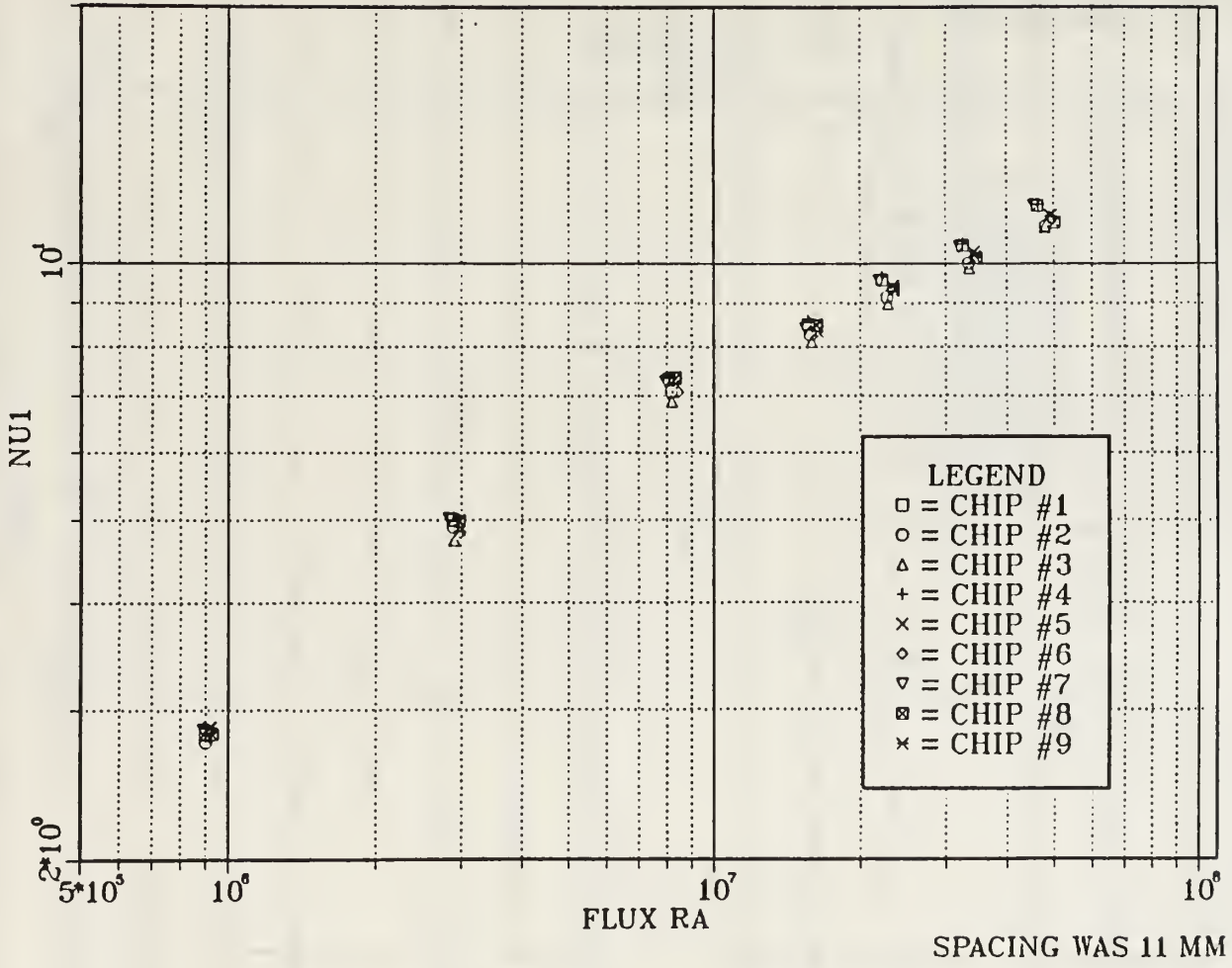

Figure 4.12. Plot of Nu1 vs. Ra, for FC-43 and 11 mm Spacing

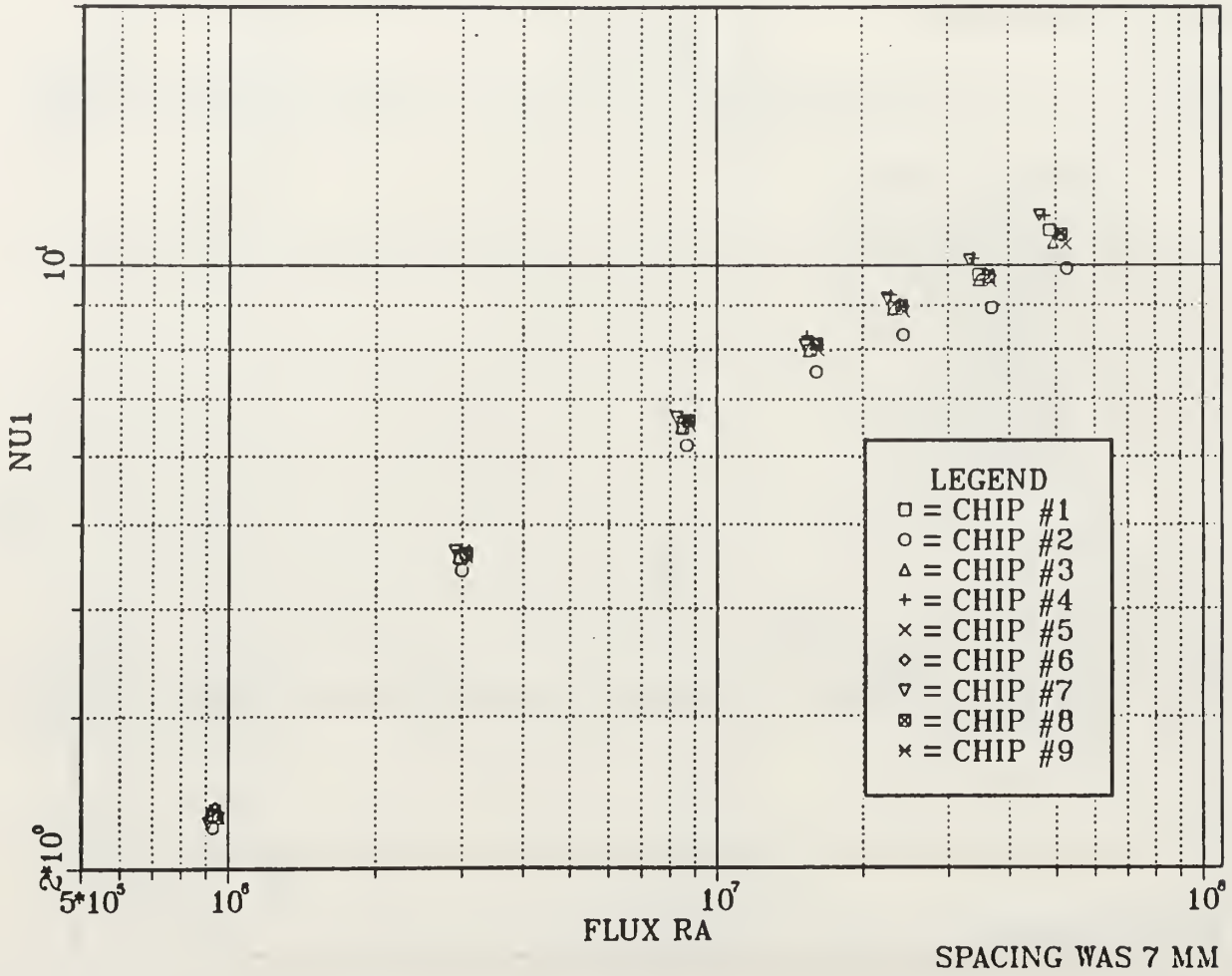

Figure 4.13. Plot of Nu1 vs. Ra_t for FC-43 and 7 mm Spacing

corresponds to 8°C temperature difference between the components having maximum and minimum average temperatures.

As is seen in Figure 4.13, for the spacing of 7 mm, Chips #2 and 7 tend to deviate from other data points. As was mentioned before, a possible reason for that is, almost 2.5°C temperature difference between the ends (correspond to inlet and outlet of the heat exchanger) of the top boundary. Some change in design of the heat exchanger which allows an increase in the mass flow rate of the coolant would result obtaining better data for this spacing.

Reviewing Figure 4.14, the same behavior of data points as in FC-75 was observed. In the range $3 * 10^6 < Ra_f < 5 * 10^7$ data points reveal almost a constant slope regardless of spacing. The slopes of best fit lines were between 0.293 and 0.308.

As is seen from Figure 4.15, decreasing spacing caused an increase in component surface temperatures throughout the array. The magnitude of the temperature increase between the chamber widths of 42 mm and 7 mm was almost 3°C at 0.115 W power level and 13°C at 2.9 W power level.

For the spacings of 42 and 30 mm, the temperature difference between the components having maximum and minimum surface temperatures in the array was less than 1.5°C. For 18 mm spacing, the component surface temperatures were almost equal regardless of power level. For the spacings of 11 mm and 7 mm, the bottom row had the lowest temperatures. The middle and top row

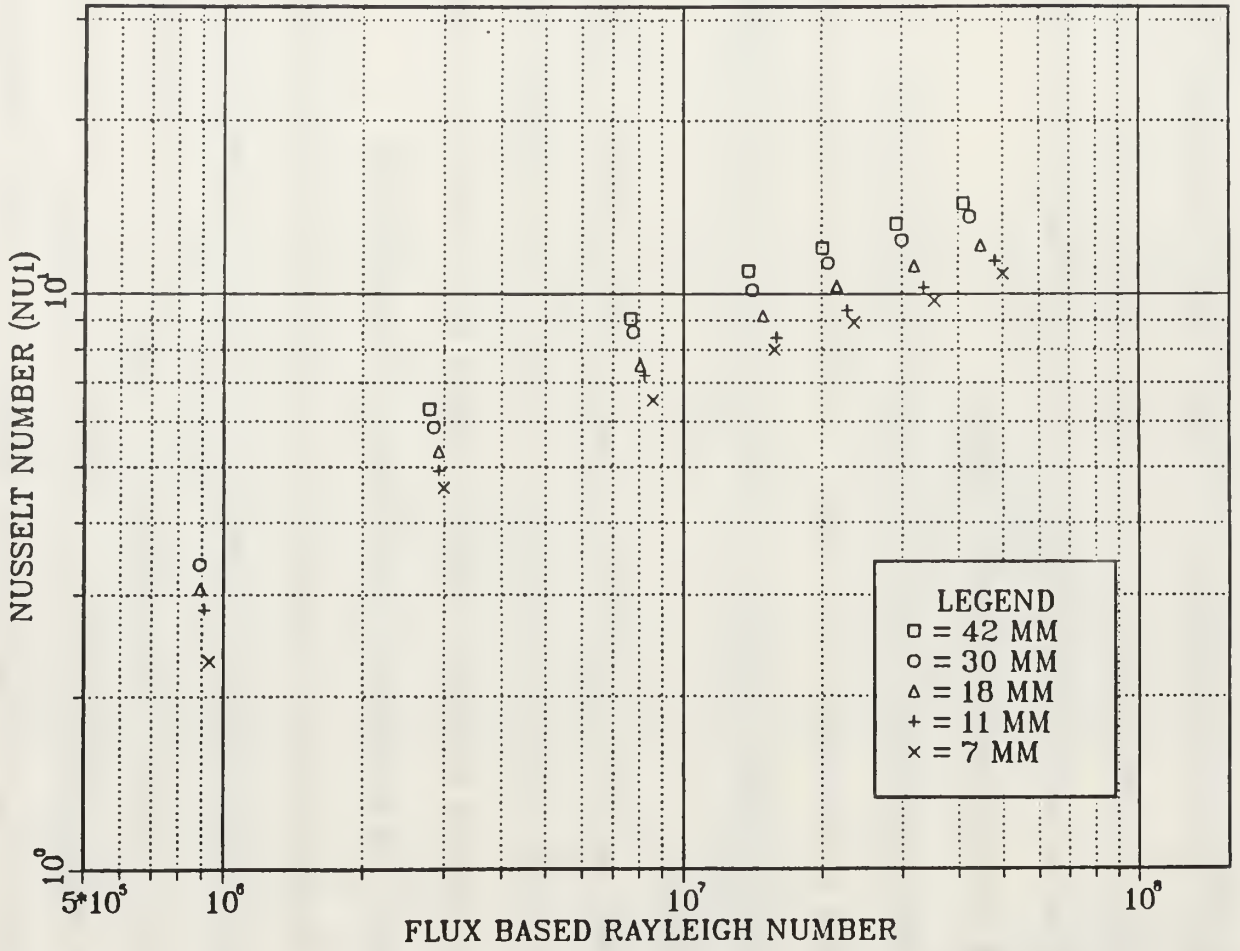

Figure 4.14. Plot of Array-averaged Nu1 vs. Ra, for FC-43 and All Spacings

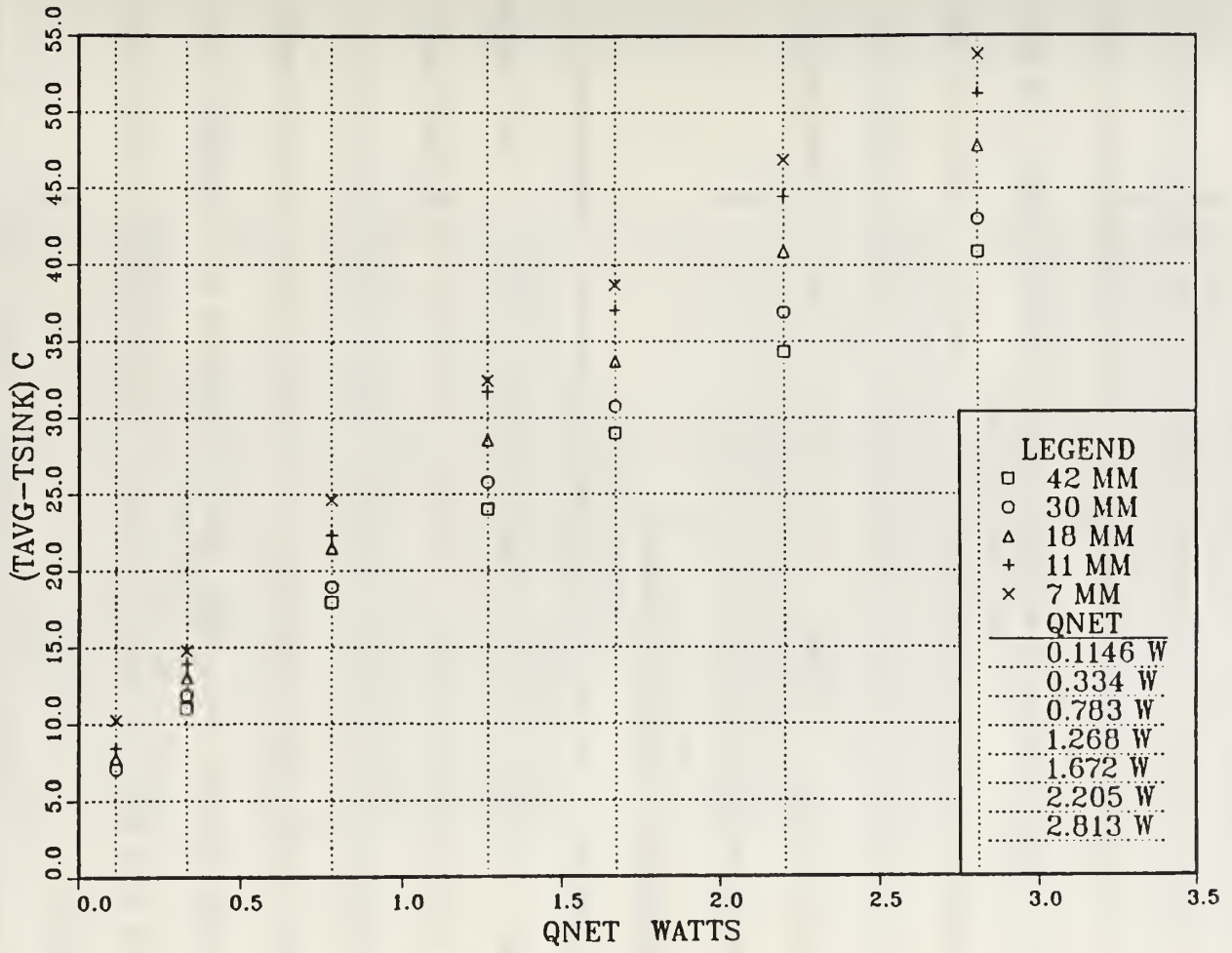

Figure 4.15. Plot of Array-averaged (T_{avg} - T_{sink}) vs. Q_{net} for FC-43 and All Spacings

behaved similarly at 11 mm spacing but an increase in middle row temperatures over the top row was observed at 7 mm spacing.

4. Correlations of the Non-dimensional Data

Due to the similar behavior of the components in the same row, plots of row-averaged and entire array-averaged *Nu1* vs. Ra_f were produced for each spacing and fluid. Using a computer software program "TABLECURVE," the best fit correlation formulas were obtained for each case in the form of $Nu1 = a\ Ra_f^b$ where *a* and *b* are constant. Both the nondimensional row-averaged and array-averaged data and correlation formulas were plotted in Figures 4.16 through 4.20 for FC-75, and Figures 4.21 through 4.25 for FC-43.

5. Formulation of Effect of Spacing

To formulate the effect of spacing on nondimensional parameters (i.e., Ra_f and *Nu1*), constant slope behavior of the data in the range $10^7 < Ra_f < 2 * 10^8$ for FC-75 and $3 * 10^6 < Ra_f < 5 * 10^7$ for FC-43 were used. Only array-averaged nondimensional parameters were considered in this study.

Since the slope was independent of the chamber width and fluid Prandtl number which was covered in this study, best fit equations were modified to the equations in the form of $Nu1 = a\ Ra_f^{0.3}$ to give minimum deviation from original best fit equations.

The data points and modified best fit equations for each fluid were presented in Figures 4.26 and 4.27.

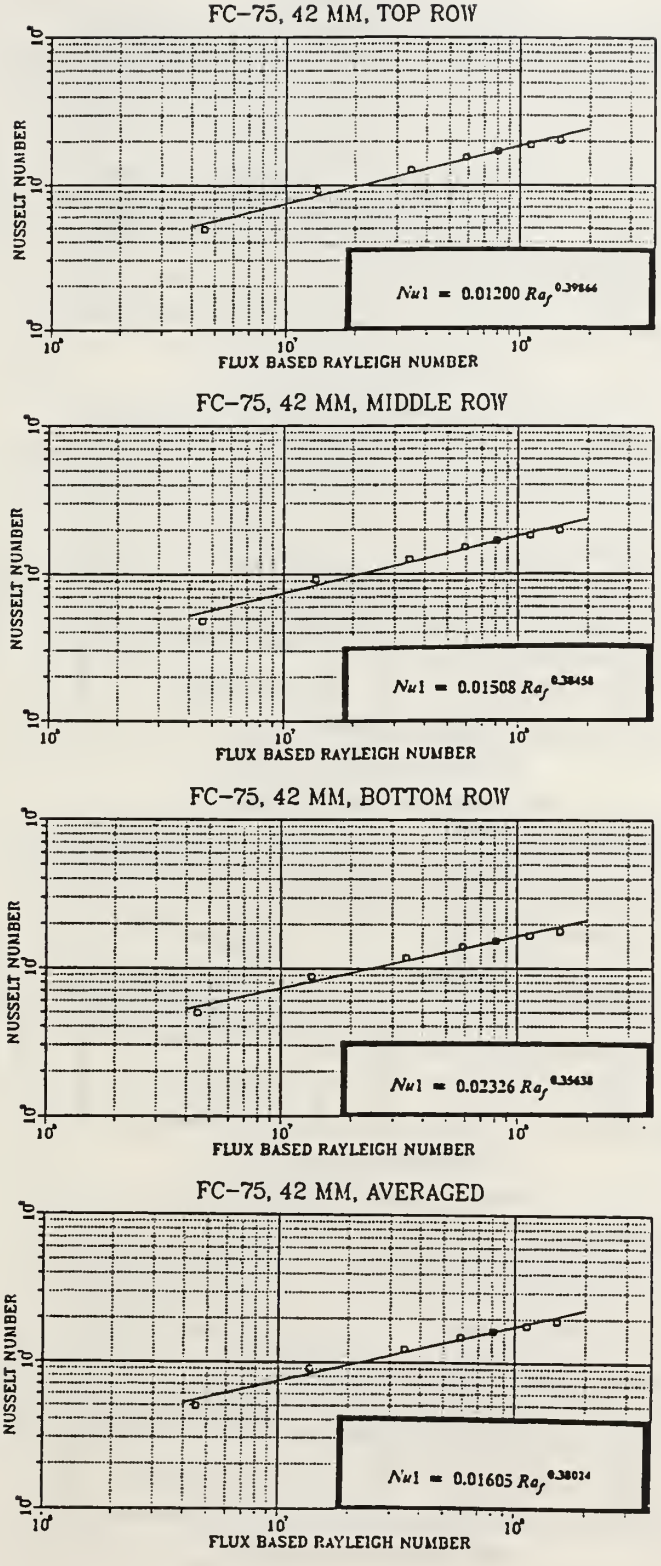

Figure 4.16. Plot of Row/Array-averaged Nu1 vs. Ra_f and Curve Fit Equations for FC-75 and 42 mm Spacing

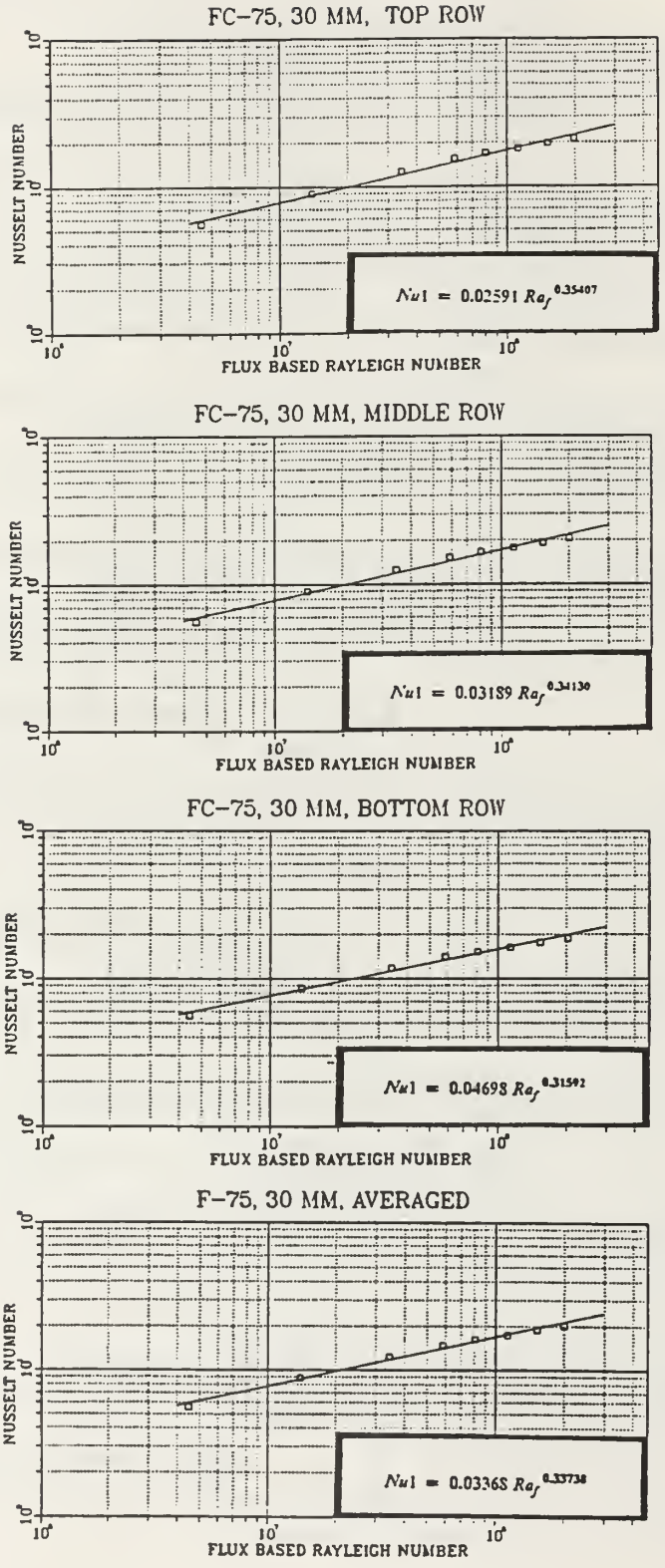

Figure 4.17. Plot of Row/Array-averaged Nu1 vs. Ra$_f$ and Curve Fit Equations for FC-75 and 30 mm Spacing

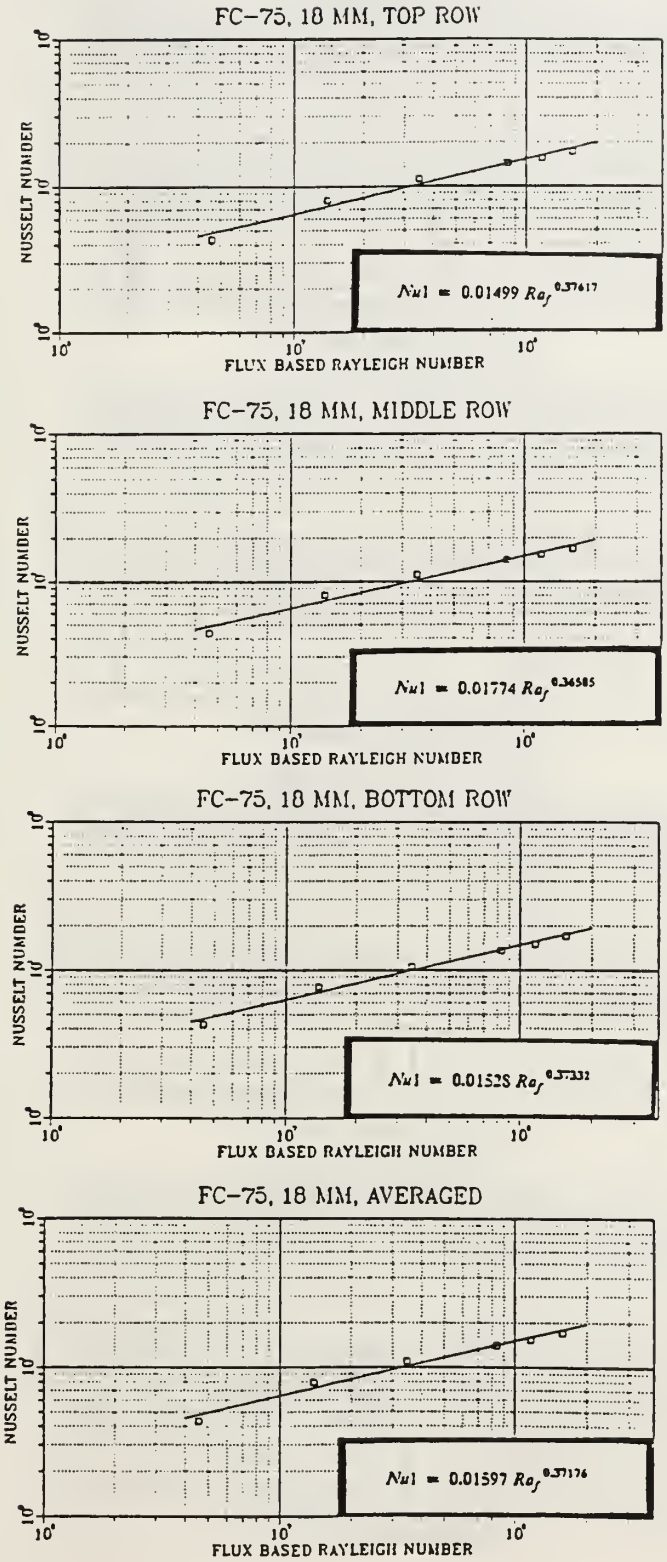

Figure 4.18. Plot of Row/Array-averaged Nu1 vs. Ra_f and Curve Fit Equations for FC-75 and 18 mm Spacing

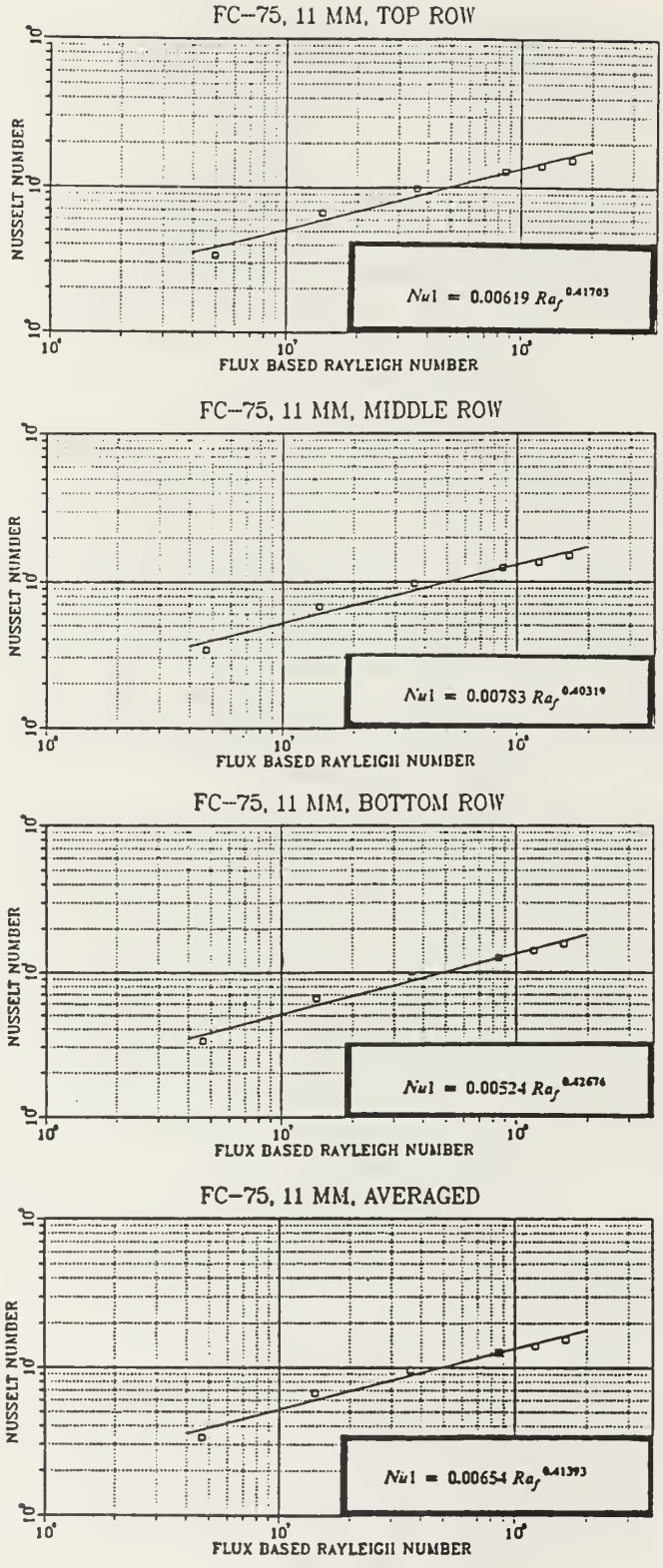

Figure 4.19. Plot of Row/Array-averaged Nu1 vs. Ra, and Curve Fit Equations for FC-75 and 11 mm Spacing

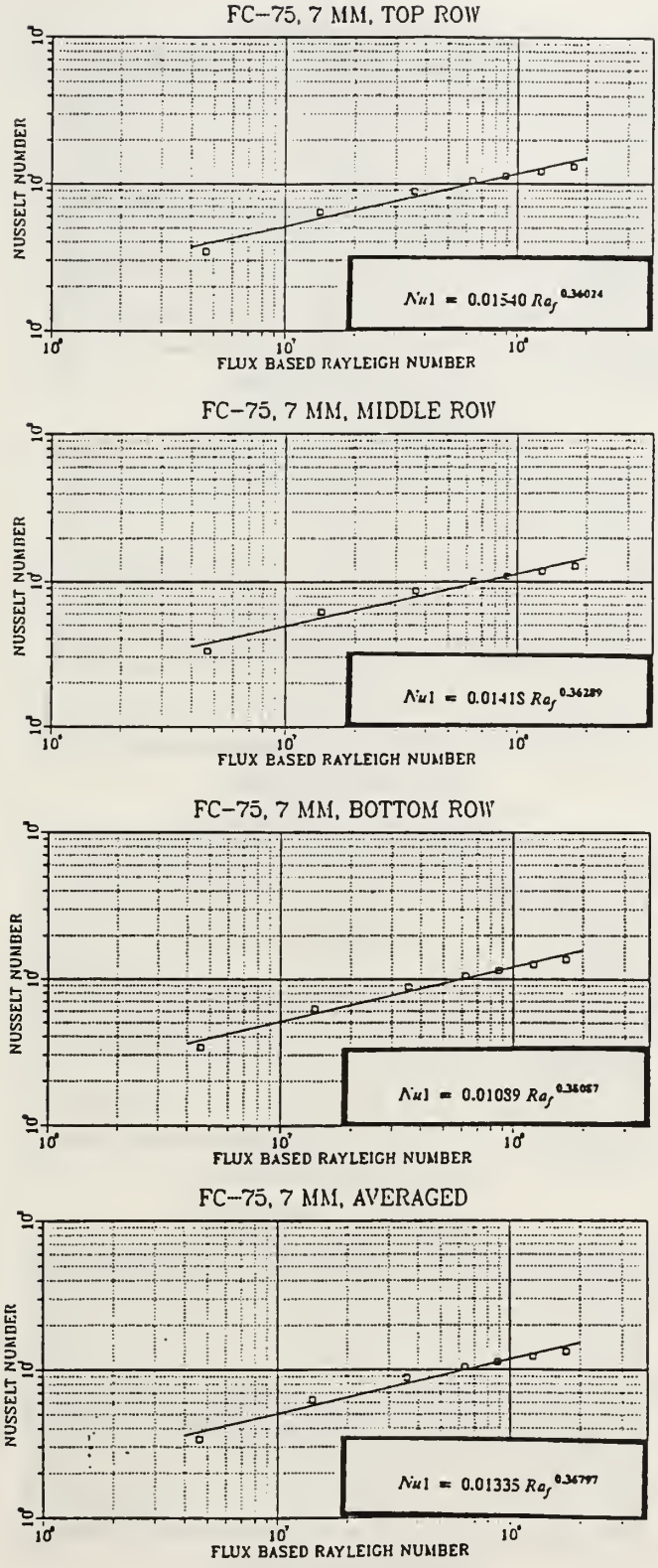

Figure 4.20. Plot of Row/Array-averaged Nu1 vs. Ra, and Curve Fit Equations for FC-75 and 7 mm Spacing

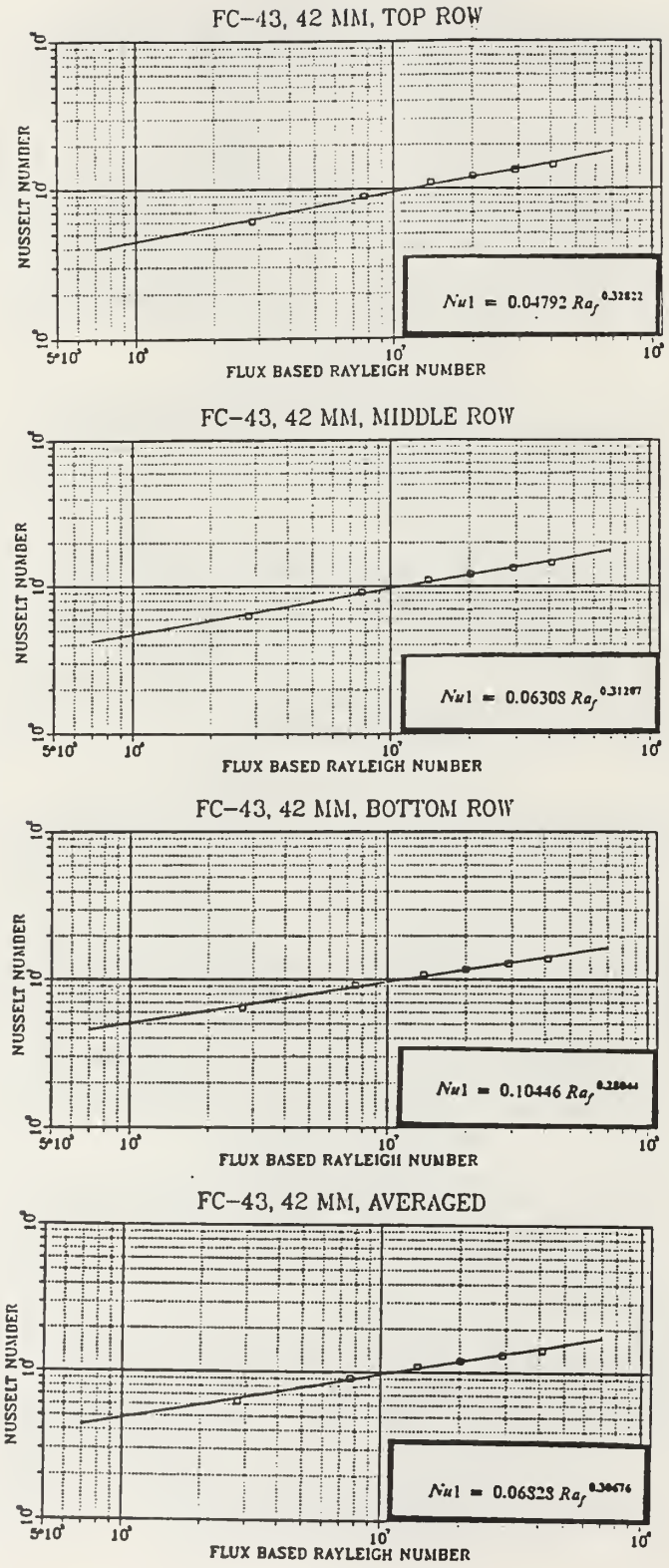

Figure 4.21. Plot of Row/Array-averaged Nu1 vs. Ra, and Curve Fit Equations for FC-43 and 42 mm Spacing

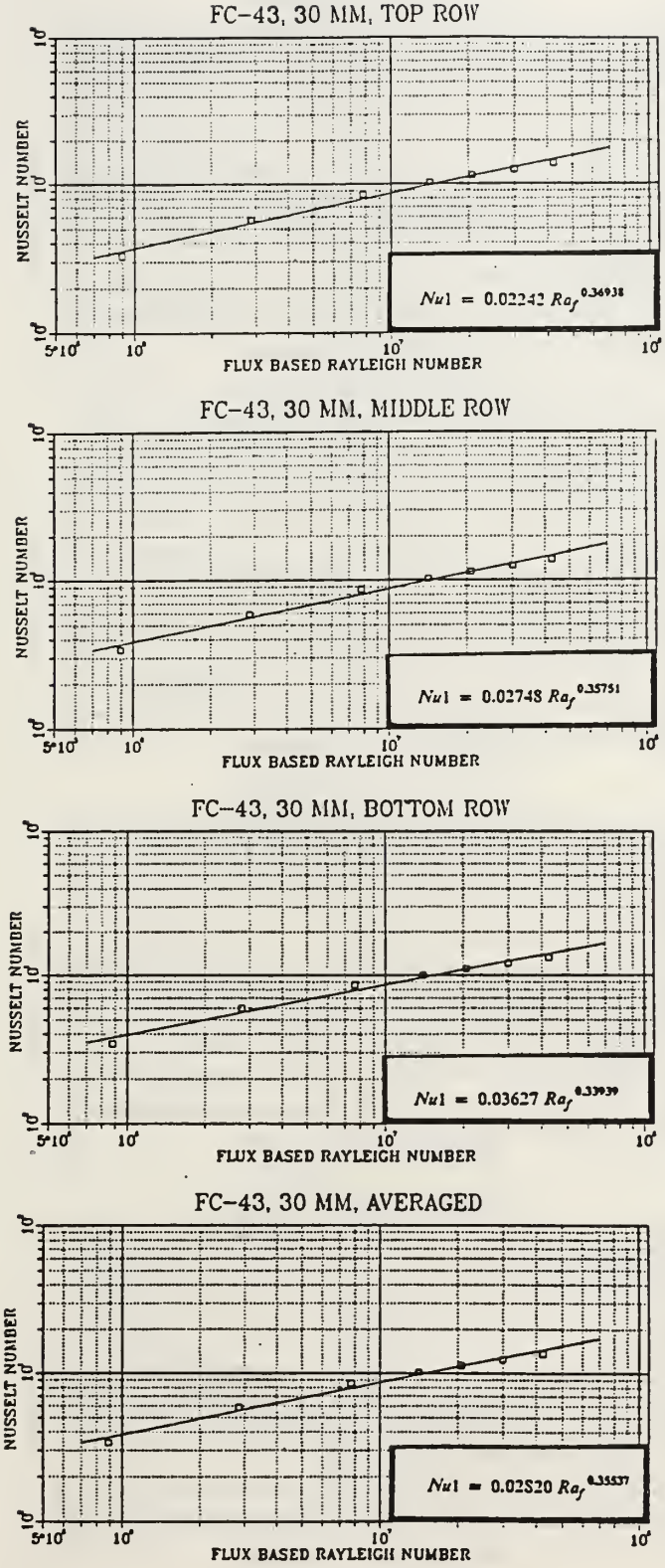

Figure 4.22. Plot of Row/Array-averaged Nu1 vs. Ra$_f$ and Curve Fit Equations for FC-43 and 30 mm Spacing

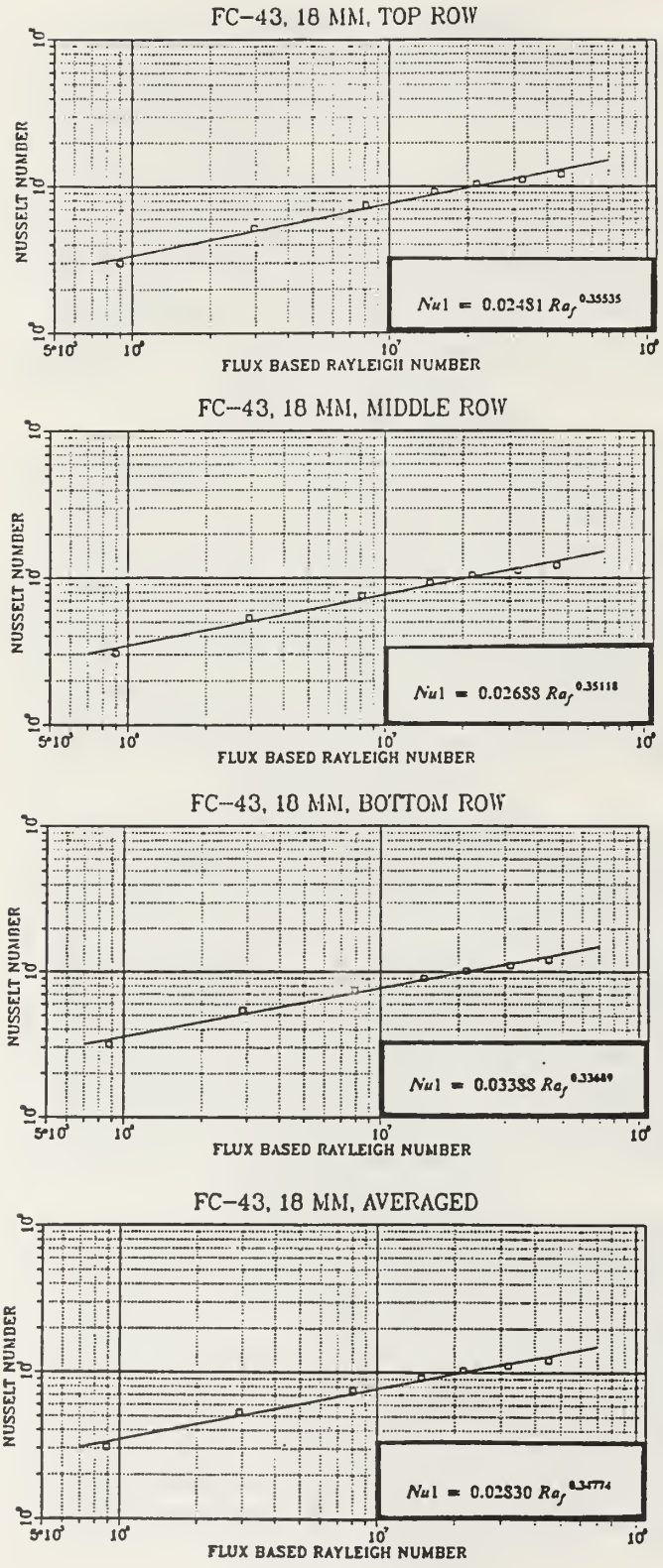

Figure 4.23. Plot of Row/Array-averaged Nu1 vs. Ra$_f$ and Curve Fit Equations for FC-43 and 18 mm Spacing

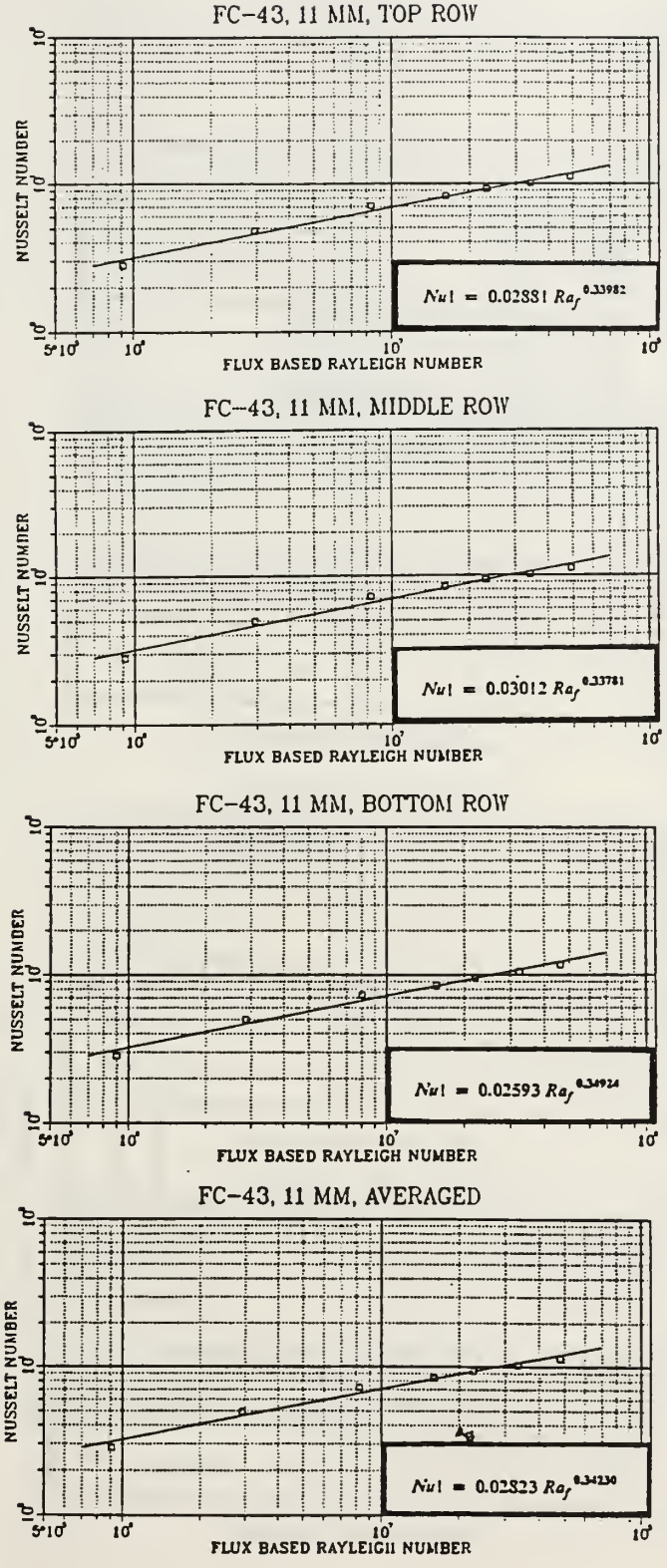

Figure 4.24. Plot of Row/Array-averaged Nu1 vs. Ra$_f$ and Curve Fit Equations for FC-43 and 11 mm Spacing

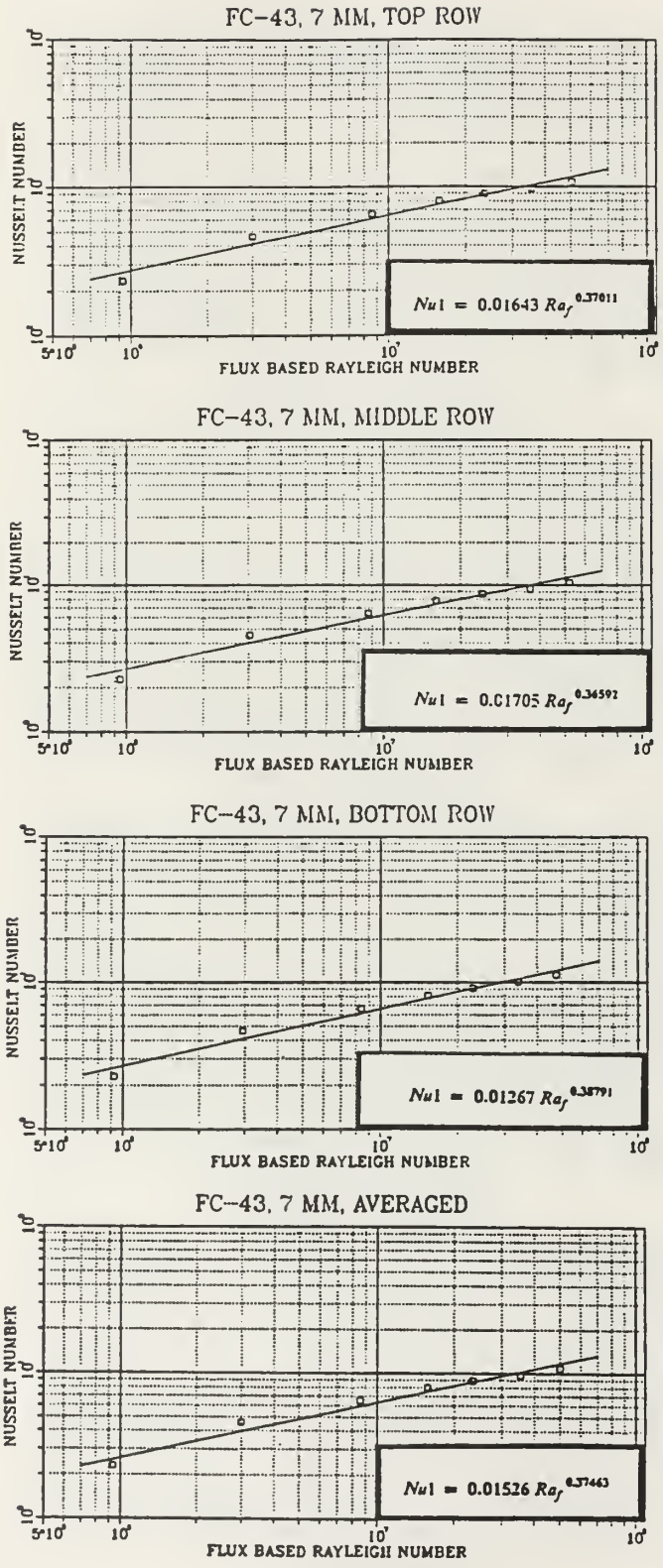

Figure 4.25. Plot of Row/Array-averaged Nu1 vs. Ra, and Curve Fit Equations for FC-43 and 7 mm Spacing

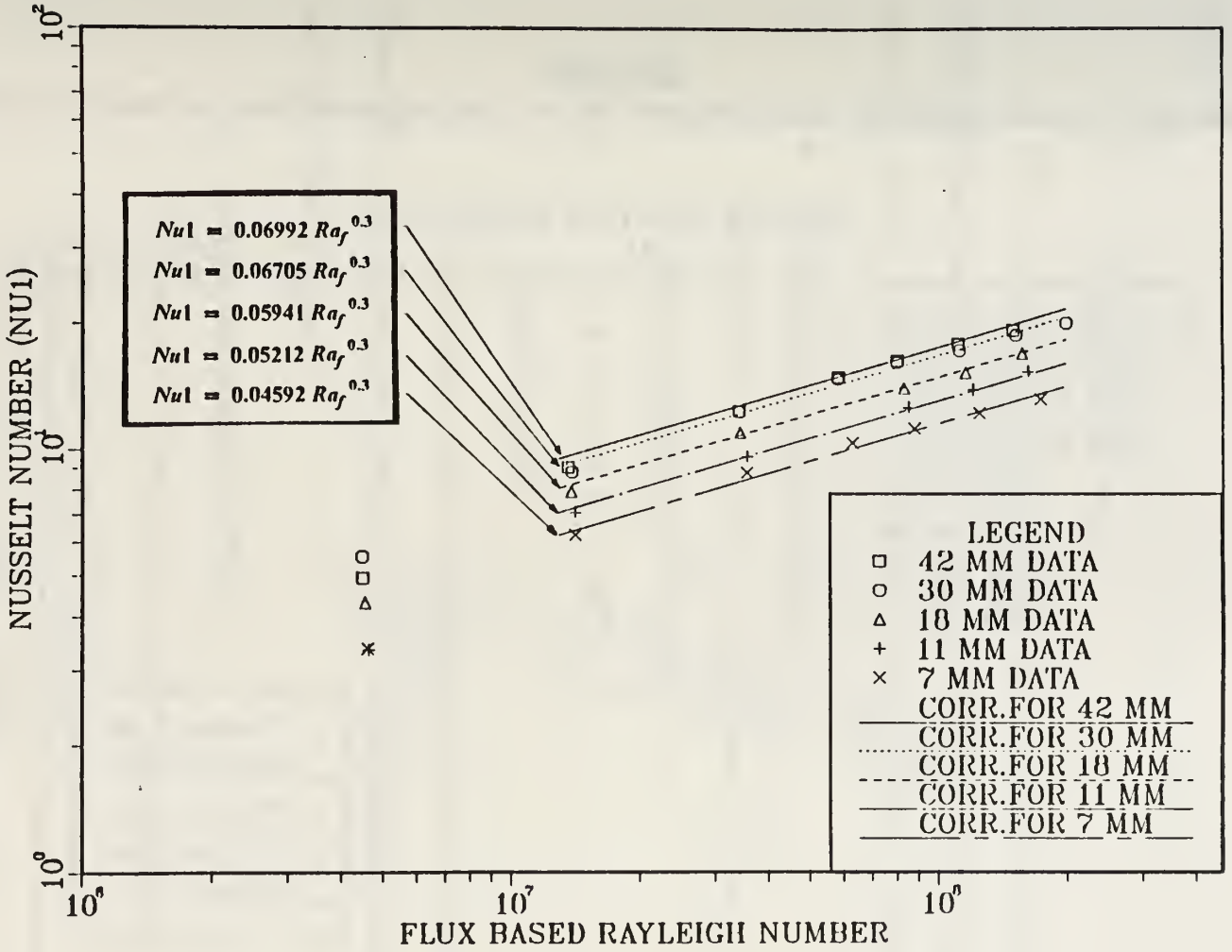

Figure 4.26. Plot of Array-averaged Nu1 vs Ra_f and the Curve Fit Equations for FC-75 and All Spacings

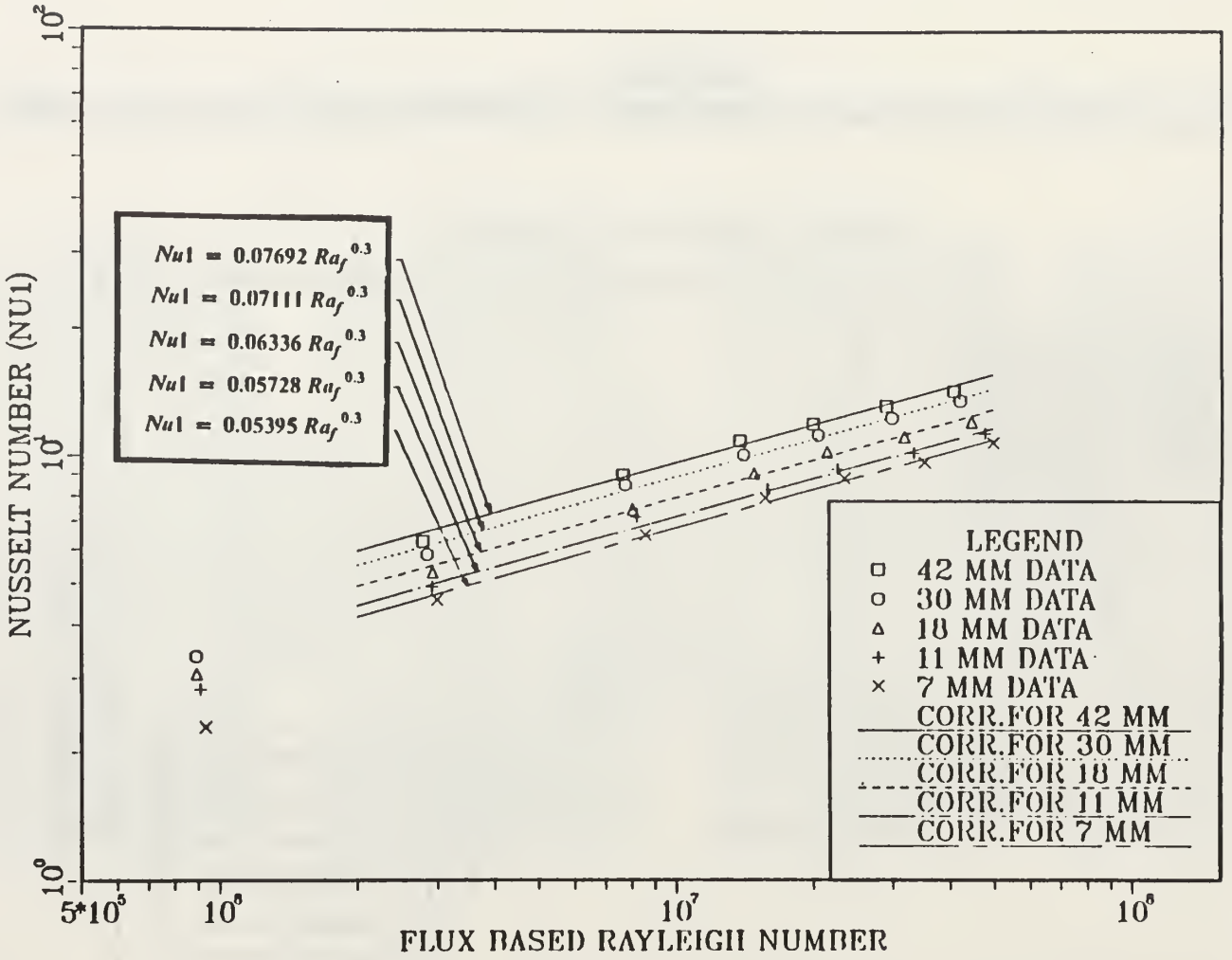

Figure 4.27. Plot of Array-averaged Nu1 vs. Ra, and the Curve Fit Equations for FC-43 and All Spacings

Introducing nondimensional spacing x^*

$$x^* = \frac{w}{H} \tag{28}$$

where,

w ≡ Chamber width
H ≡ Height of the component

The functional relationship between the correlation constant (a) and nondimensional spacing (X^*) in the form of $a = c\,(X^*)^m$ where c and m are constant was determined for each fluid. These are presented in Figures 4.28 and 4.29.

a. Single Correlation for FC-75

A general form of correlation equation was obtained as

$$Nu1 = 0.04561\,(x^*)^{0.23139}\,Ra_t^{0.3}$$

$$1.3 * 10^7 < Ra_t < 2 * 10^8 \tag{29}$$

$$21.8 < Pr < 31.8$$

Using the above equation correlates the data with less than 8% (for 42 mm and 7 mm spacings) and less than 1.7% (for other spacings) deviation from the original best fit equations.

b. Single Correlation for FC-43

A general form of correlation equation was obtained as

$$Nu1 = 0.05142\,(x^*)^{0.20191}\,Ra_t^{0.3}$$

$$3 * 10^6 < Ra_t < 5 * 10^7 \tag{30}$$

$$57.4 < Pr < 131$$

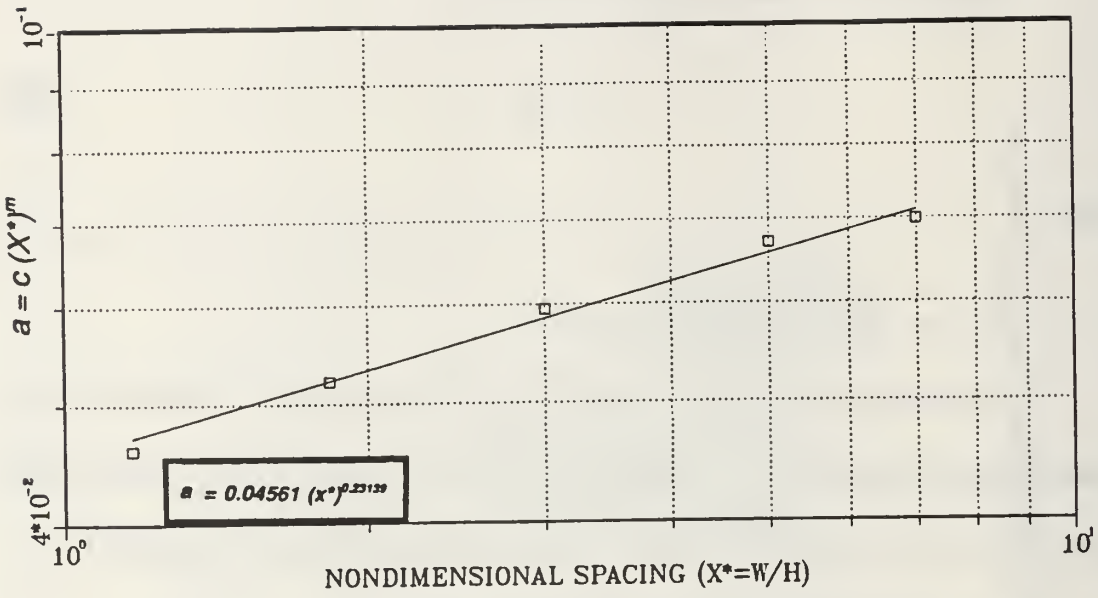

Figure 4.28. Plot of X* vs. a for FC-75

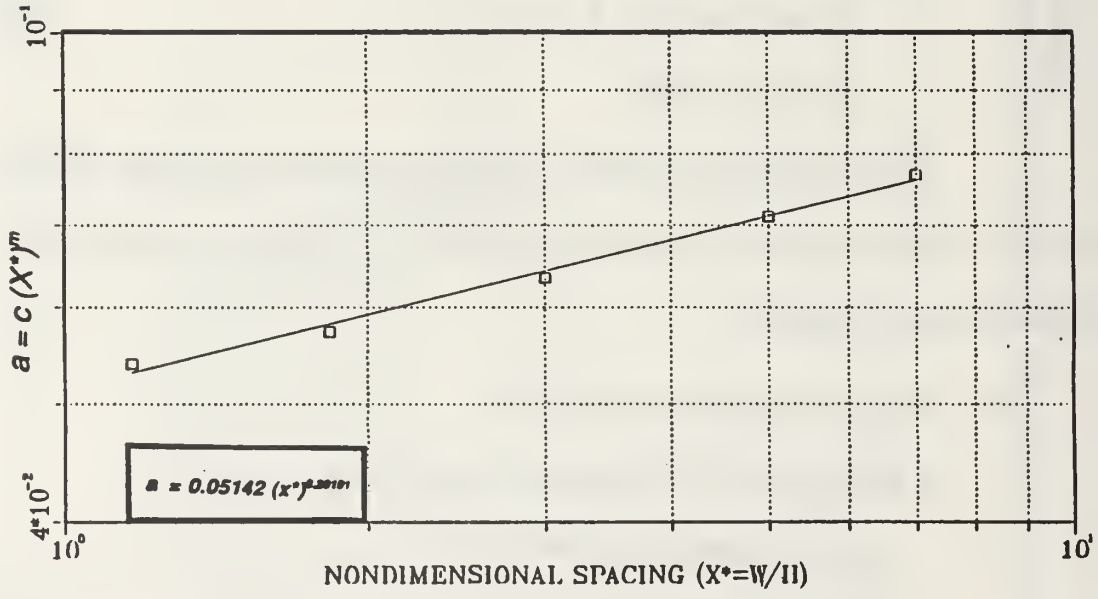

Figure 4.29. Plot of X* vs. a for FC-43

Using the above equation, correlates the data with less than 2.5% (for 30 mm and 18 mm) and less than 1% (for other spacings) deviation from the original best fit equations.

B. TEMPERATURE FLUCTUATIONS IN STEADY STATE

Temperature fluctuations in steady state were measured and plotted for the spacings of 30 mm (for FC-75 only) and 7 mm in the power range of 0.115 W to 2.9 W per component. Three channels were scanned at a rate of approximately 3 times per second for a period of 200 seconds. The location of the thermocouples which are Chip #1 front surface (Channel 0), Chip #3 front surface (Channel 12) and Chip #6 top surface (Channel 31) were the same as previous experiments to compare the results. See Figure 4.39 for the location of the scanned thermocouples.

1. General Observations

Temperature fluctuations at low power levels were not significant regardless of dielectric liquid and spacing. Almost no fluctuation was observed at the bottom row at any power level and spacing. Increase in fluctuation magnitude was observed as the spacing decreases and location of the heater approaches to top heat exchanger. Dielectric fluid Prandtl number also effected the fluctuation magnitude. For 7 mm spacing in case of FC-75 maximum fluctuation magnitude was almost 1°C, in case of FC-43 it was less than 0.4°C.

2. Surface Temperature Fluctuations for FC-75

Plots of temperature fluctuations are presented in Figures 4.30 through 4.32 for 30 mm spacing and Figures 4.33 through 4.35 for 7 mm spacing. At low power levels (0.115 W and 0.34 W) almost no fluctuations were observed in any of the channels. Reducing chamber width from 30 mm to 7 mm didn't effect the temperature fluctuations significantly in the bottom row. The fluctuation amplitude was less than 0.2°C. Almost three order of magnitude increase was observed in the top row due to the effect of reducing spacing from 30 mm to 7 mm. It increased from 0.35°C to 1°C in both channels 12 and 31. Benedict (1988) reported the maximum fluctuation amplitude for the same arrangement and 30 mm spacing but with different boundary conditions (i.e., 10°C to 10°C) as 0.85°C. Torres (1988) reported it for vertical arrangement and 30 mm spacing as 1.7°C and for 9 mm spacing as 2°C. Reducing chamber width didn't cause significant effect on temperature fluctuations.

3. Surface Temperature Fluctuations for FC-43

Surface temperature fluctuations were measured for the chamber width of 7 mm and presented in Figures 4.36 through 4.38. Fluctuation magnitude in any of the channels was not significant. It was less than 0.2°C in channel 0 and less than 0.4°C in channel 12 and 31 at any power level.

Decrease in fluctuation magnitude from FC-75 to 43 may be due to the effect of fluid Prandtl number, since in the case of FC-75 and 7 mm spacing Rayleigh number was almost $1.8 * 10^8$, in the case of FC-43 it was $5 * 10^7$.

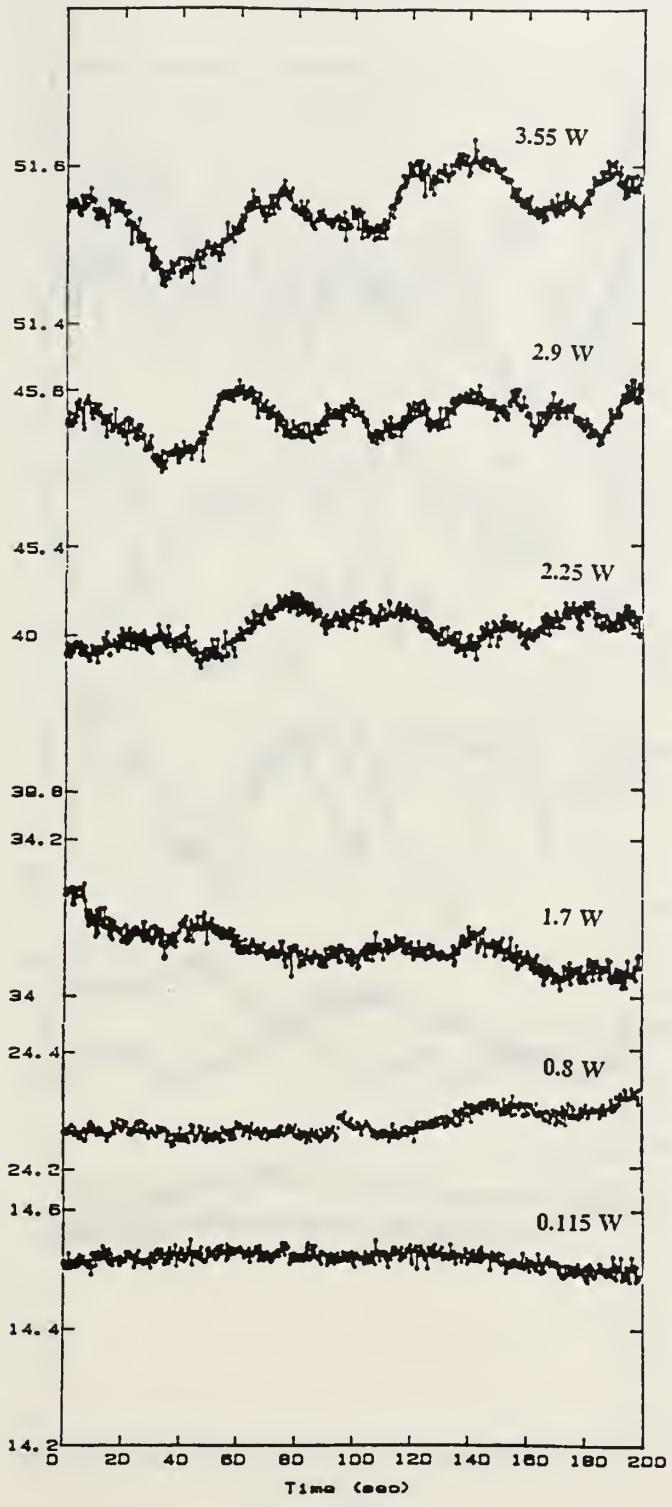

Figure 4.30. Temperature Fluctuations for Thermocouple No. 0 at Different Power Levels (FC-75 and 30 mm Spacing)

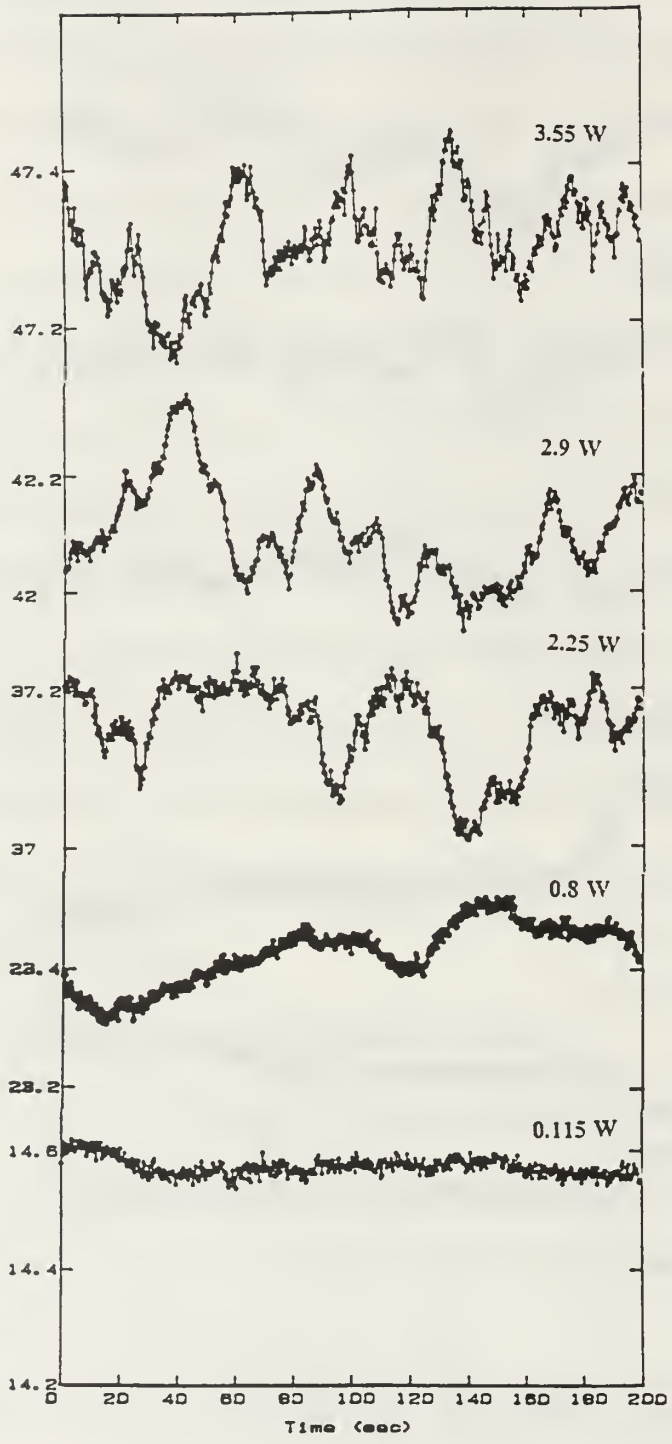

Figure 4.31. Temperature Fluctuations for Thermocouple No. 12 at Different Power Levels (FC-75 and 30 mm Spacing)

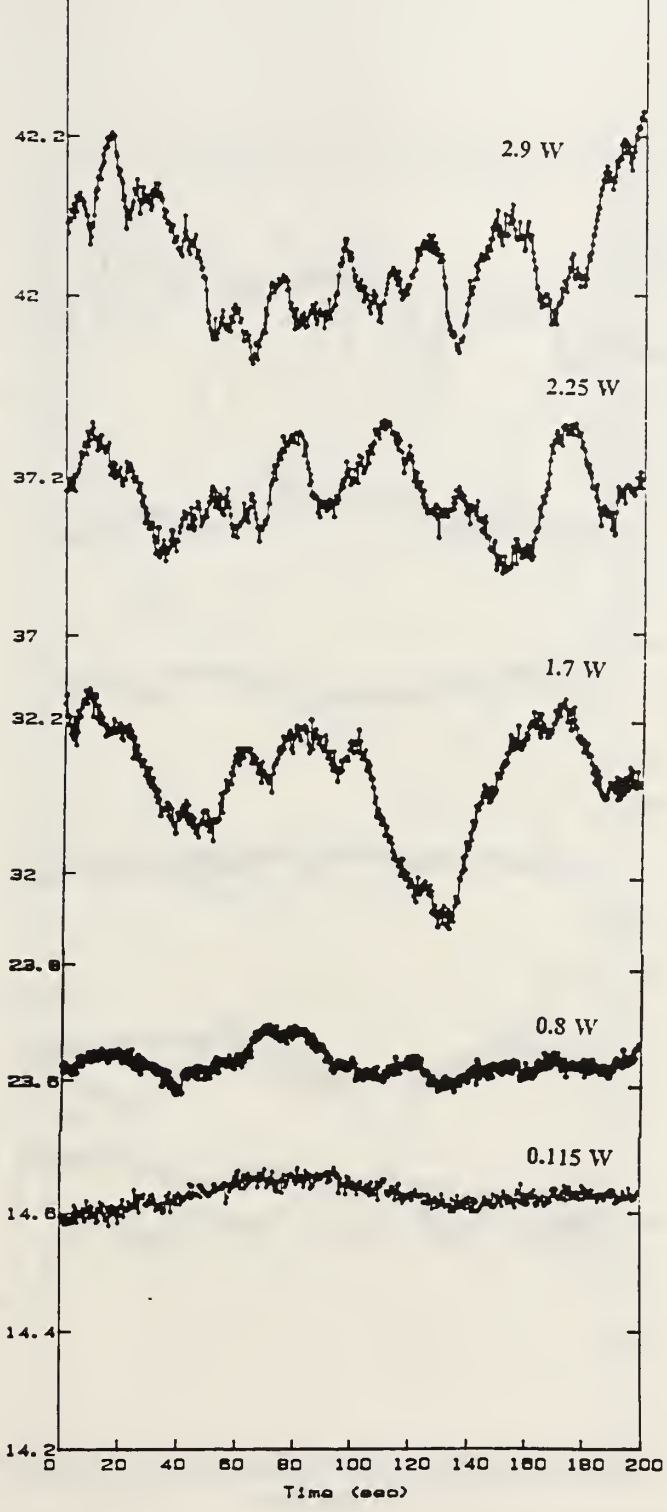

Figure 4.32. Temperature Fluctuations for Thermocouple No. 31 at Different Power Levels (FC-75 and 30 mm Spacing)

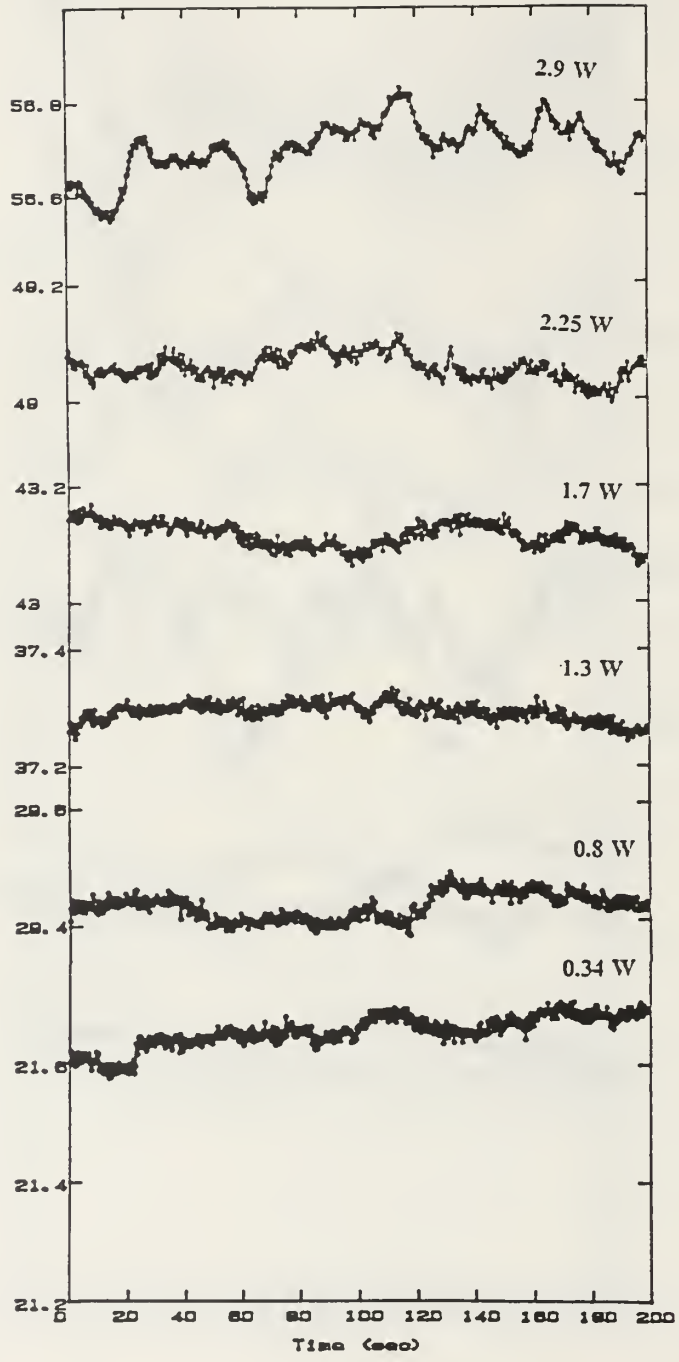

Figure 4.33. Temperature Fluctuations for Thermocouple No. 0 at Different Power Levels (FC-75 and 7 mm Spacing)

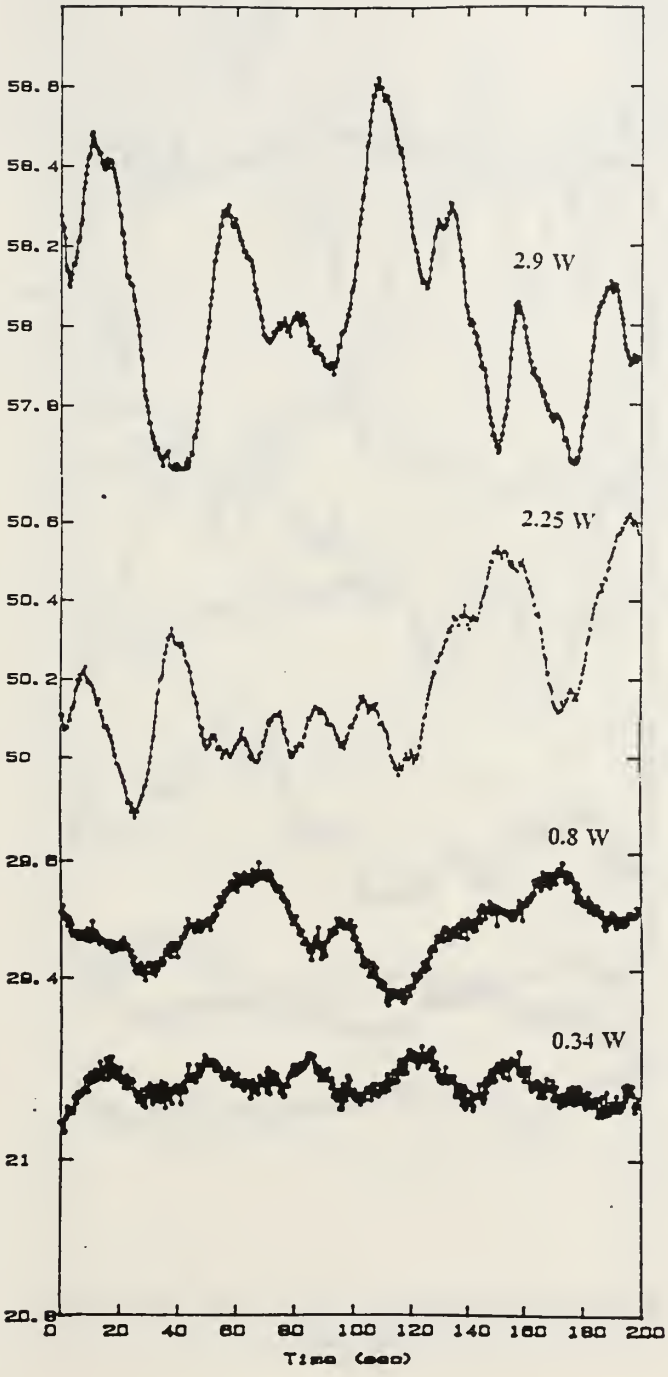

Figure 4.34. Temperature Fluctuations for Thermocouple No. 12 at Different Power Levels (FC-75 and 7 mm Spacing)

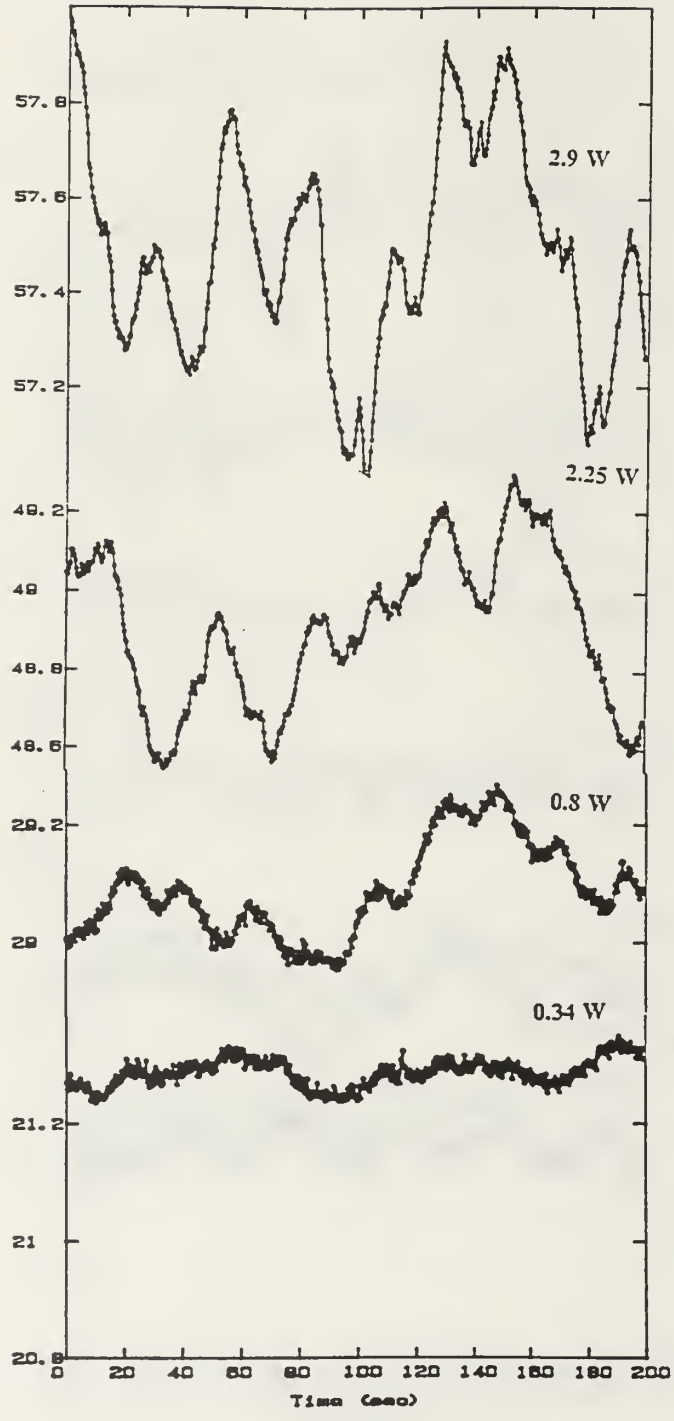

Figure 4.35. Temperature Fluctuations for Thermocouple No. 31 at Different Power Levels (FC-75 and 7 mm Spacing)

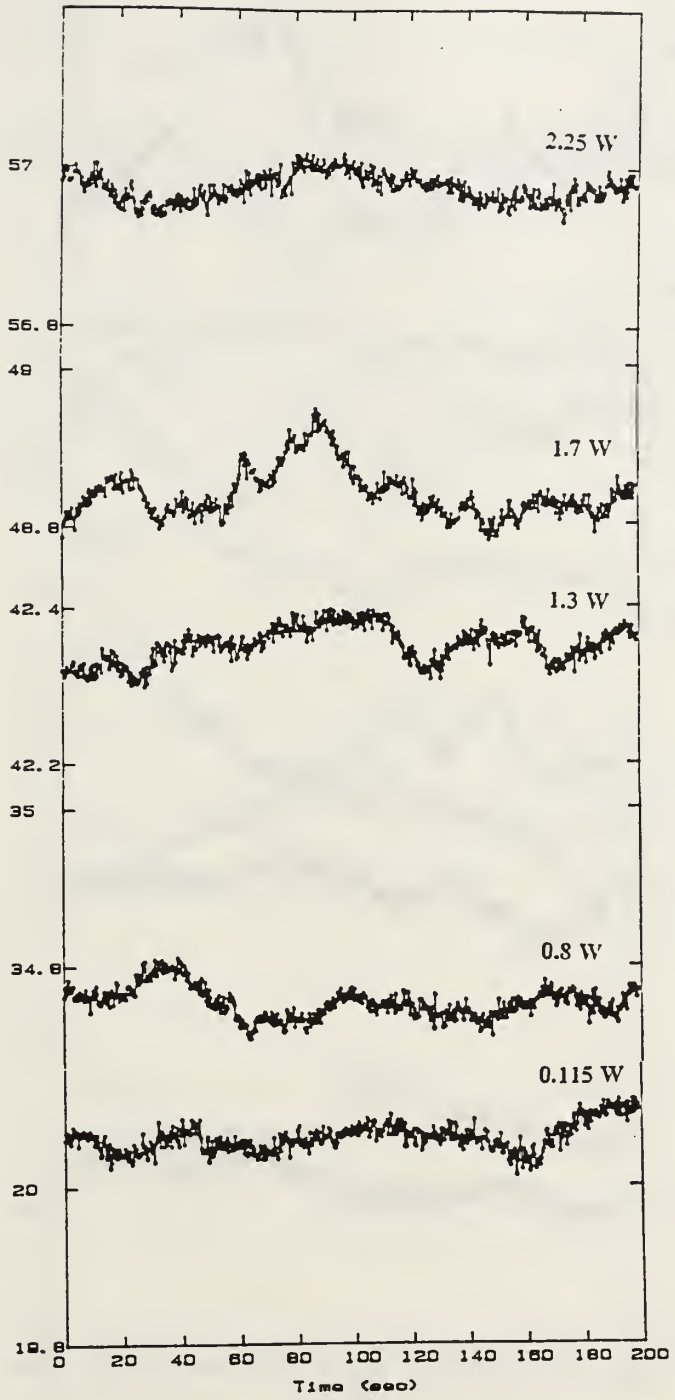

Figure 4.36. Temperature Fluctuations for Thermocouple No. 0 at Different Power Levels (FC-43 and 7 mm Spacing)

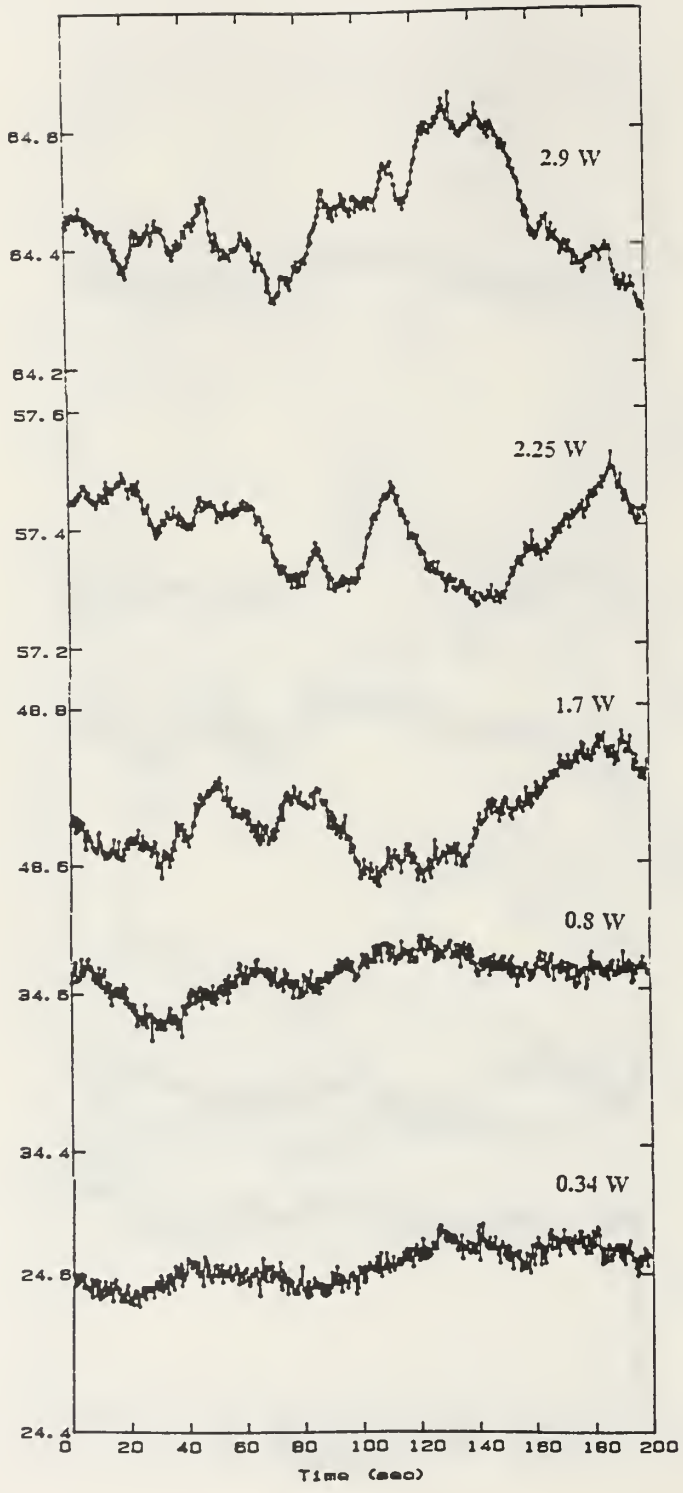

Figure 4.37. Temperature Fluctuations for Thermocouple No. 12 at Different Power Levels (FC-43 and 7 mm Spacing)

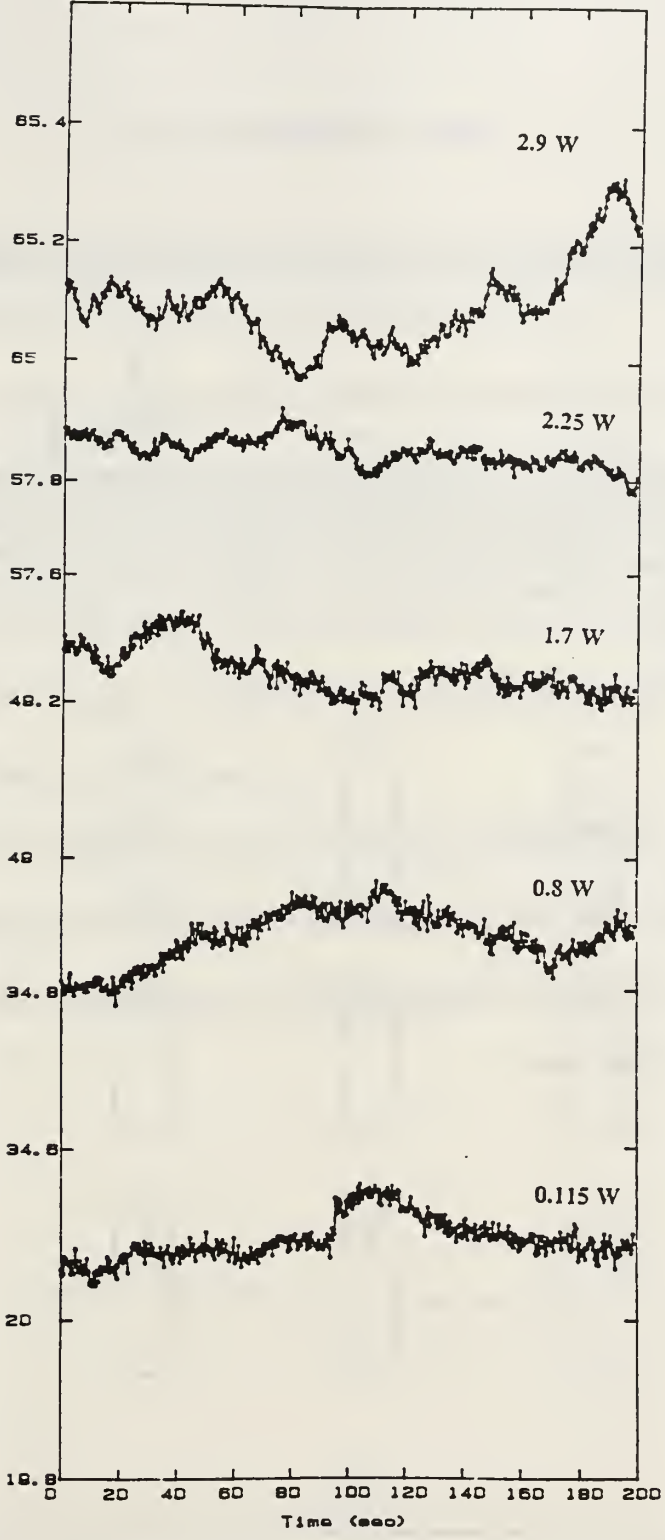

Figure 4.38. Temperature Fluctuations for Thermocouple No. 31 at Different Power Levels (FC-43 and 7 mm Spacing)

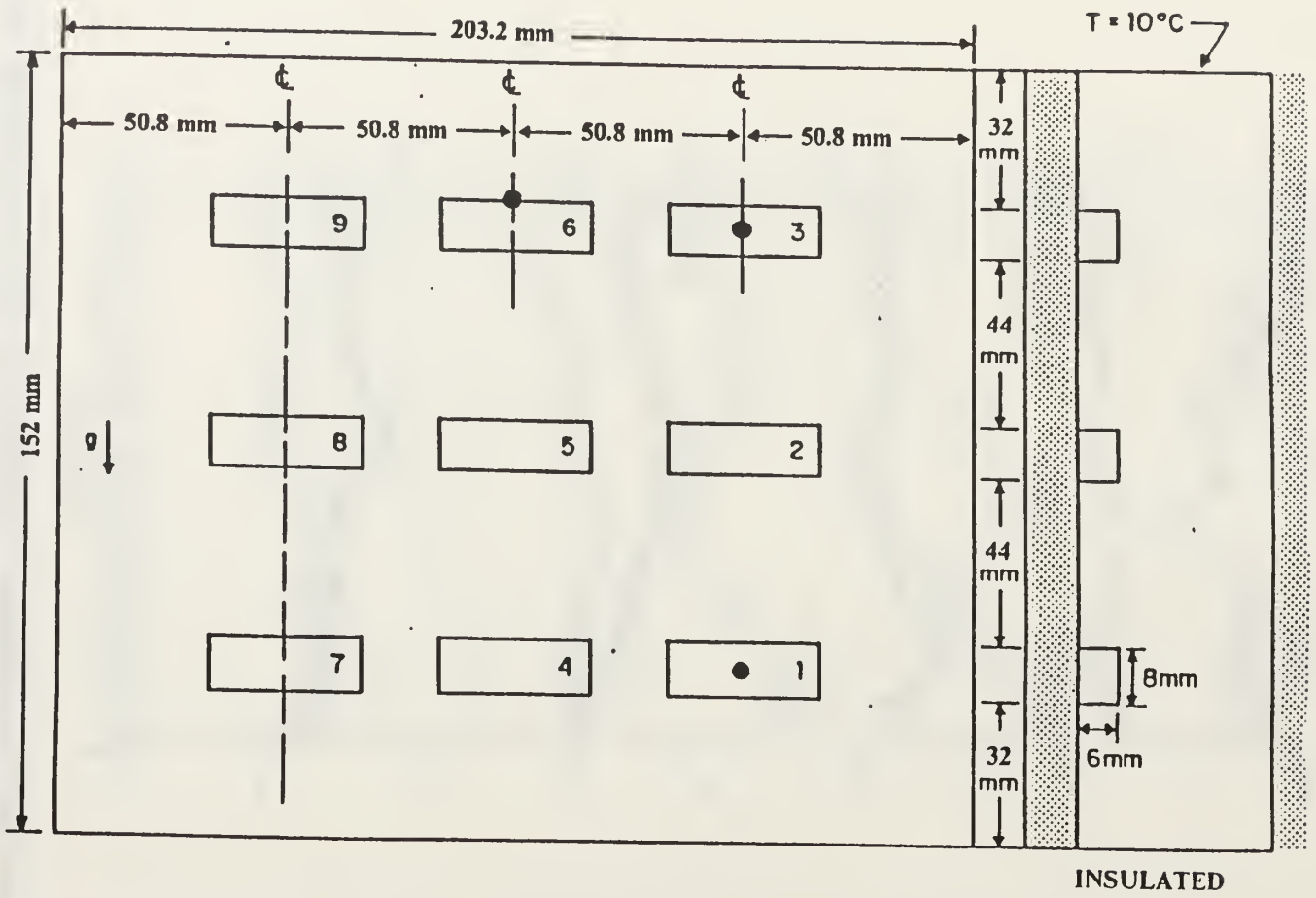

Figure 4.39. Location of Thermocouples Scanned for Measurements of Fluctuations

V. RECOMMENDATIONS

1. Continuation of this experiment using dielectric liquids other than used in this study to investigate the effects of fluid Prandtl number.

2. Investigate the variation in heat transfer characteristics of the components in the array at specific spacing and power level by conducting detailed flow visualization experiments for each fluid at selective spacings.

3. Change the design of the heat exchanger to allow an increase in the mass flow rate of coolant through the effective area of the heat exchanger to obtain better data, especially at 7 mm spacing.

4. Investigate the effect of vertical orientation of the chips.

5. Four unused channels of the data acquisition system out of 80 can be used to measure the temperatures within the dielectric fluid or on circuit board.

APPENDIX A. SAMPLE CALCULATIONS

Sample calculations were carried out for component #4 at 0.8 W power level. Spacing was 7 mm and dielectric liquid was FC-75.

A. CALCULATION OF THE AVERAGE COMPONENT WETTED SURFACE TEMPERATURE

1. Conversion of Thermocouple Voltages to Temperatures

Using conversion formula and the constants for copper constantan thermocouples.

$$T = D1 + D2 * emf + D3 * emf^2 + D4 * emf^3 + D5 * emf^4 + D6 * emf^5 + D7 * emf^6 + D8 * emf^7 \quad (31)$$

where,

D1	=	0.10086091	D5	=	-9247486589.6
D2	=	25727.9	D6	=	6.98E11
D3	=	-767345.8	D7	=	-2.66E13
D4	=	7802.5596	D8		=3.94E14

Using thermocouple #18, from Equation (31)

emf(18) = 1.151E-3 V

T(18) = 28.84°C

2. Average Component Surface Temperature

Wetted surface areas of component,

Acen = 1.92E-4 m^2

Atop = Abot = 4.85E-5 m^2

Aright = Aleft = 1.44E-4 m^2

Atotal = 5.76E-4 m^2

Surface temperatures of component

T(18) = 28.84°C

T(19) = 28.87°C

T(20) = 28.7°C

T(21) = 28.6°C

T(22) = 28.6°C

From Equation (1)

$$T_{avg} = 28.73°C$$

B. CALCULATION OF THE HEATER POWER

Volt = *emf*(61) = 3.453 V

emf(65) = 2.899 V

R_p = 2 Ohm

From Equation (2)

Power(4) = 2.899 (3.453 - 2.899) / 2

Power(4) = 0.8030 W

C. CALCULATION OF CONDUCTION LOSS

T_{cb} = T(23) = 31.01°C

T_{bp} = T(60) = 20.79°C

t = 00.012 m

k = 0.195 W/mk

A = 1.92E-4 m^2

From Equation (4)

$$R_c = 0.012/(0.195 * 1.92E\text{-}4) = 320.51\ K/W$$

From Equation (5)

$$\Delta T4 = 31.01 - 20.79 = 10.22°C$$

Then from Equation (3)

$$Q_{loss} = 0.035\ W$$

D. HEAT TRANSFER COEFFICIENT

T(54) = 9.048°C

T(55) = 10.55°C

T(56) = 10.35°C

From Equation (8)

$$T_{sink} = (9.048 + 10.55 + 10.35) / 3 = 9.98°C$$

From Equation (7)

$$Q_{net} = 0.8030 - 0.035 = 0.768\ W$$

Then from Equation 6

h = 0.768 / [5.76E-4 (28.73 - 9.98)]

h = 71.11 W/m^{2}K

E. THERMOPHYSICAL PROPERTIES OF FC-75 AT FILM TEMPERATURE

From Equation (9)

$$T_{film} = (28.73 + 9.98) / 2 = 19.36°C$$

1. Thermal Conductivity

From Equation (10),

k = (0.65 - 7.8947E-4 * 19.36) / 10

k = 0.06347 W/mK

2. Density

From Equation (12)

ρ = (1.825 - 0.00246 * 19.36) * 1000

ρ = 1777.37 kg/m^3

3. Specific Heat

From Equation (14),

C_p = (0.24111 + 3.7037E-4 * 19.36) 4180

C_p = 1037.82 j/kg K

4. Kinematic Viscosity

From Equation (15)

ν = [1.4074 - 2.964E-2 * 19.36 + 3.8018E-4 * $(19.36)^2$

- 2.7308E-6 * $(19.36)^3$ + 8.1679E-9 * $(19.36)^4$]E-6

ν = 9.574E-7 m^2/s

5. Thermal Expansion Coefficient

From Equation (17)

β = 0.00246 / (1.825 - 0.00246 * 19.36)

β = 0.001384 K^{-1}

6. Thermal Diffusivity

From Equation 19,

α = 0.06347 / (1777.37 * 1037.82)

α = 3.4409E-8 m^2/s

F. CALCULATION OF THE NUSSELT NUMBERS

1. Nusselt Number Based on the Height of the Component

L1 = 0.008 m

From Equation (20)

Nu1 = 71.11 * 0.008 / 0.06347

Nu1 = 8.966

2. Nusselt Number Based on the Ratio (Area/Perimeter) of the Component

From Equation (22)

L2 = [(24 * 8/64) + 2 (8 * 6/28) + 2 (24 * 6/60)]E-3

L2 = 11.229E-3 m

Then from Equation 21

$Nu2 = 71.11 * 11.229E\text{-}3/0.06347$

$Nu2 = 12.584$

G. CALCULATION OF THE GRASHOF NUMBER

From Equation (24)

$\Delta T = 28.73 - 9.98 = 18.75°C$

Then from Equation (23),

$Gr = 9.81 * 0.001384 (0.008)^3 * 18.75 / (9.574E\text{-}7)^2$

$Gr = 142196.69$

H. CALCULATION OF THE PRANDTL NUMBER

From Equation (25)

$Pr = 9.574E\text{-}7 / 3.4409E\text{-}8$

$Pr = 27.82$

I. CALCULATION OF THE RAYLEIGH NUMBERS

1. Temperature Based Rayleigh Number

From Equation (26),

$Ra_t = 142196.69 * 27.82 = 3.96E6$

2. Flux Based Rayleigh Number

From Equation (27)

Ra_f = 9.81 * 0.001384 $(0.008)^4$ * 0.786 / [0.06347

* 9.574E-7 * 3.4409E-8 * 5.76E-4]

Ra_f = 3.547E7

APPENDIX B. UNCERTAINTY ANALYSIS

Sample calculations of the uncertainty analysis are carried out for component #4 at 0.8 W power level. Spacing was 7 mm and dielectric liquid was FC-75.

A. UNCERTAINTIES IN THE NET HEAT CONVECTED INTO THE FLUID

Starting with the power dissipated by the heater

$$Power = emf(I) * (Volt - emf(I)) / R_p$$

$$Power = function\ (emf(I), Volt, R_p)$$

$$P1 = \frac{\partial\ Power}{\partial\ emf(I)} = \frac{Volt - 2\ emf(I)}{R_p}$$

$$P2 = \frac{\partial\ Power}{\partial\ Volt} = \frac{emf(I)}{R_p}$$

$$P3 = \frac{\partial\ Power}{\partial\ R_p} = \frac{-\ emf(I)\ (\ Volt - emf(I)}{R_P^2}$$

$$UPower = [(P1 * Uemf\ (I))^2 + (P2 * UVolt)^2 + (P3 * UR_p)^2]^{1/2}$$

where,

$Uemf(I) = UVolt = \pm\ 0.001\ V$ *Resolution/Precision of Measuring Device*

$UR_p = \pm\ 0.05\ \Omega$

Substituting numerical values,

$emf(61) = Volt = 3.453\ V$

$emf(65) = 2.899\ V$

$R_p = 2\ \Omega$

$Power = 0.803\ W$

$P1 = (3.453 - 2 * 2.899) / 2 = -1.1725$

$P2 = 2.899/2 = 1.2604$

$P3 = - [2.899\ (3.453 - 2.899)] / 2^2 = -0.4015$

$UPower = [(1.1725 * 0.001)^2 + (1.2604 * 0.001)^2 + (0.4015 * 0.05)^2]^{1/2}$

$UPower = 0.02015\ W$

$$\frac{UPower}{Power} * 100\% = \frac{0.02015}{0.8030} * 100\% = 2.51\%$$

$$\underline{Power = 0.803 \pm 2.51\ W}$$

Conduction loss through the back of the circuit board

$Q_{loss} = \Delta T / R_c$

$Q_{loss} = function\ (\Delta T, R_c)$

$$Q1 = \frac{\partial Q_{loss}}{\partial \Delta T} = 1 / R_c$$

$$Q2 = \frac{\partial Q_{loss}}{\partial R_c} = -\Delta T / R_c^2$$

$$UQ_{loss} = [(Q1 * U\Delta T)^2 + (Q2 * UR_c)^2]^{1/2}$$

where,

$$U\Delta T = 10\%$$

$$UR_c = 10\%$$

Substituting numerical values,

$$\Delta T = 10.22^{\circ}C$$

$$R_c = 320.51\ K/W$$

$$Q_{loss} = 0.035\ W$$

$$U\Delta T = 1.022^{\circ}C$$

$$UR_c = 32.051\ K/W$$

$$Q1 = 1/320.51 = 0.00312$$

$$Q2 = -10.22 / 320.51^2 = -9.949E\text{-}5$$

$$UQ_{loss} = [(0.00312 * 1.022)^2 + (9.949E\text{-}5 * 32.051)^2]^{1/2}$$

$$UQ_{loss} = 0.00451\ W$$

$$\frac{UQ_{loss}}{Q_{loss}} * 100\% = \frac{0.00451}{0.035} * 100\% = 12.89\%$$

$$\underline{Q_{loss} = 0.035 \pm 12.9\%\ W}$$

Net heat added to the FC-75

$$Q_{net} = Power - Q_{loss}$$

$$UQ_{net} = [UPower^2 + UQ_{loss}{}^2]^{1/2}$$

Substituting numerical values,

$$Q_{net} = 0.768\ W$$

$$UPower = 0.02015\ W$$

$$UQ_{loss} = 0.00451\ W$$

$$UQ_{net} = (0.02015^2 + 0.00451^2)^{1/2}$$

$$UQ_{net} = 0.02065\ W$$

$$\frac{UQ_{net}}{Q_{net}} * 100\% = \frac{0.02065}{0.768} * 100\% = 2.69\%$$

$$\underline{Q_{net} = 0.768 \pm 2.69\%\ W}$$

B. UNCERTAINTIES IN NUSSELT NUMBER

Starting with average heat transfer coefficient,

$$h = Q_{net} / [A_{total} (T_{avg} - T_{sink})]$$

$$h = function\ (Q_{net}, A_{total}, \Delta T)$$

$$h1 = \frac{\partial h}{\partial Q_{net}} = \frac{1}{A_{total} * \Delta T}$$

$$h2 = \frac{\partial h}{\partial A_{total}} = -\frac{Q_{net}}{A_{total}^2 * \Delta T}$$

$$h3 = \frac{\partial h}{\partial \Delta T} = -\frac{Q_{net}}{A_{total} * \Delta T^2}$$

$$Uh = [(h1 * UQ_{net})^2 + (h2 * UA_{total})^2 + (h3 * U\Delta T)^2]^{1/2}$$

where,

$$U\Delta T = 1\%$$

Calculation of uncertainty in A_{total}

$$A_{total} = 2BH + 2LH + LB$$

where,

L, B, H = Length, width, and height of the component

$$A1 = \frac{\partial A_{total}}{\partial L} = 2H + B$$

$$A2 = \frac{\partial A_{total}}{\partial B} = 2H + L$$

$$A3 = \frac{\partial A_{total}}{\partial H} = 2B + 2L$$

$$UA_{total} = [(A1 * UL)^2 + (A2 * UB)^2 + (A3 * UH)^2]^{1/2}$$

Substituting numerical values

$UL = UH = UB = 1E\text{-}4\ m$

$L = 0.024\ m$

$B = 0.008\ m$

$H = 0.006\ m$

$A1 = 2 * 0.006 + 0.008 = 0.02$

$A2 = 2 * 0.006 + 0.024 = 0.036$

$A3 = 2(0.008 + 0.024) = 0.064$

$UA_{total} = [(0.02 * 0.0001)^2 + (0.036 * 0.0001)^2 + (0.064 * 0.0001)^2]^{1/2}$

$UA_{total} = 7.61E\text{-}6\ m^2$

Going back to calculation of the uncertainty in heat transfer coefficient and substituting numerical values,

$h = 71.11\ W/m^2\ K$

$\Delta T = 18.75°C$

$U\Delta T = 0.1875°C$

$A_{total} = 5.76E\text{-}6\ m^2$

$$h1 = \frac{1}{5.76E\text{-}4 * 18.75} = 92.59$$

$$h2 = -\frac{0.768}{(5.76E\text{-}4)^2\ 18.75} = -123456.79$$

$$h3 = -\frac{0.768}{5.76E\text{-}4 * 18.75^2} = -3.79$$

$$Uh = [(92.59 * 0.02065)^2 + (123456.79 * 7.61E\text{-}6)^2 + (3.79 * 0.1875)^2]^{1/2}$$

$$Uh = 2.2457\ W/m^2K$$

$$\frac{Uh}{h} * 100\% = \frac{2.2457}{71.11} * 100\% = 3.16\%$$

$$h = 71.11 \pm 3.16\%\ W/m^2K$$

From Equation (20)

$$Nu1 = hL1 / k$$

$$Nu1 = function\ (h, L1, k)$$

$$N1 = \frac{\partial Nu1}{\partial h} = \frac{L1}{k}$$

$$N2 = \frac{\partial Nu1}{\partial L} = \frac{h}{k}$$

$$N3 = \frac{\partial Nu1}{\partial k} = -\frac{hL}{k^2}$$

$$UNu1 = [(N1 * Uh)^2 + (N2 * UL1)^2 + (N3 * Uk)^2]^{1/2}$$

Assuming no uncertainties in FC-75 properties

$$UNu1 = [(N1 * Uh)^2 + (N2 * UL1)^2]^{1/2}$$

Substituting numerical values

$L1 = 0.008\ m$

$h = 71.11\ W/m^2K$

$k = 0.06347\ W/mK$

$N1 = 0.008 / 0.06347 = 0.126$

$N2 = 71.11 / 0.06347 = 1120.37$

$$UNu1 = [(0.126 * 2.2457)^2 + (1120.37 * E\text{-}4)^2]^{1/2}$$

$UNu1 = 0.3043$

$$\frac{UNu1}{Nu1} * 100\% = \frac{0.3043}{8.966} = 3.39\%$$

$$\underline{Nu1 = 8.966 \pm 3.39\%}$$

C. UNCERTAINTIES IN FLUX BASED RAYLEIGH NUMBER

From Equation (27)

$$Ra_f = g\beta L^4 Q_{net} / k_f \nu \alpha A_{total})$$

Again, assuming no uncertainties in FC-75 properties and gravitational acceleration,

$$Ra_f = function\ (L^4, Q_{net}, A_{total})$$

$$R1 = \frac{\partial Ra_f}{\partial L^4} = \frac{4 g \beta Q_{net}}{k \nu \alpha A_{total}} L^3$$

$$R2 = \frac{\partial Ra_f}{\partial Q_{net}} = \frac{g \beta L^4}{k \nu \alpha A_{total}}$$

$$R3 = \frac{\partial Ra_f}{\partial A_{total}} = - \frac{g \beta L^4 Q_{net}}{A_{total}^2}$$

$$URa_f = [(R1 * UL^4)^2 + (R2 * UQ_{net})^2 + (R3 * UA_{total})^2]^{1/2}$$

Substituting numerical values

$\beta = 0.001384\ K^{-1}$

$k = 0.06347\ W/mK$

$\nu = 9.574E\text{-}7\ m^2/s$

$\alpha = 3.4409E\text{-}8\ m^2/s$

$Q_{net} = 0.768\ W$

$UQ_{net} = 0.02065\ W$

$A_{total} = 5.76E\text{-}4\ m^2$

$UA_{total} = 7.61E\text{-}6\ m^2$

$L = 0.008\ m$

$UL = 1E\text{-}4\ m$

$R1 = 1.7731E10$

$R2 = 46175179.2$

$R3 = 6.1567E10$

$URa_f = [(1.7731E10 * E\text{-}4)^2 + (46175179.2 * 0.02065)^2 + (6.1567E10 * 7.61E\text{-}6)^2]^{1/2}$

$URa_f = 2066398$

$$\frac{URa_f}{Ra_f} * 100\% = \frac{2066398}{3.547E7} * 100\% = 5.83\%$$

$Ra_f = 3.547E7 \pm 5.83\%$

APPENDIX C. TABLES

TABLE 1. REDUCED DATA FOR FC-75 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 12DEC2320
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.113	4.991	4.933	6.923
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.46
	AVERAGE TEMPERATURE: 14.848			
	SINK TEMPERATURE: 9.857			
2	.113	4.981	4.932	6.922
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.45
	AVERAGE TEMPERATURE: 14.836			
	SINK TEMPERATURE: 9.857			
3	.113	4.991	4.914	6.897
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.44
	AVERAGE TEMPERATURE: 14.848			
	SINK TEMPERATURE: 9.857			
4	.114	4.950	4.995	7.011
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.48
	AVERAGE TEMPERATURE: 14.807			
	SINK TEMPERATURE: 9.857			
5	.116	4.969	5.085	7.137
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.57
	AVERAGE TEMPERATURE: 14.826			
	SINK TEMPERATURE: 9.857			
6	.116	5.060	4.967	6.971
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.92
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.55
	AVERAGE TEMPERATURE: 14.917			
	SINK TEMPERATURE: 9.857			
7	.113	4.928	4.958	6.958
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.42
	AVERAGE TEMPERATURE: 14.785			
	SINK TEMPERATURE: 9.857			
8	.117	5.157	4.905	6.885
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.94
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.59
	AVERAGE TEMPERATURE: 15.014			
	SINK TEMPERATURE: 9.857			
9	.117	5.179	4.881	6.851
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.94
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.59
	AVERAGE TEMPERATURE: 15.036			
	SINK TEMPERATURE: 9.857			

TABLE 2. REDUCED DATA FOR FC-75 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13DEC0740
THE POWER SETTING PER CHIP WAS: 0.34 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.330	8.153	8.808	12.363
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.54
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.56
	AVERAGE TEMPERATURE: 18.307			
	SINK TEMPERATURE: 10.155			
2	.329	7.900	9.062	12.720
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.49
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.48
	AVERAGE TEMPERATURE: 18.055			
	SINK TEMPERATURE: 10.155			
3	.329	7.864	9.089	12.757
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.45
	AVERAGE TEMPERATURE: 18.019			
	SINK TEMPERATURE: 10.155			
4	.331	8.073	8.927	12.530
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.52
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.60
	AVERAGE TEMPERATURE: 18.226			
	SINK TEMPERATURE: 10.155			
5	.339	7.868	9.367	13.147
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.87
	AVERAGE TEMPERATURE: 18.023			
	SINK TEMPERATURE: 10.155			
6	.337	7.885	9.295	13.047
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.80
	AVERAGE TEMPERATURE: 18.040			
	SINK TEMPERATURE: 10.155			
7	.327	8.059	8.821	12.380
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.52
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.41
	AVERAGE TEMPERATURE: 18.213			
	SINK TEMPERATURE: 10.155			
8	.339	7.994	9.211	12.928
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.51
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.88
	AVERAGE TEMPERATURE: 18.148			
	SINK TEMPERATURE: 10.155			
9	.338	7.922	9.282	13.028
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.49
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.85
	AVERAGE TEMPERATURE: 18.076			
	SINK TEMPERATURE: 10.155			

TABLE 3. REDUCED DATA FOR FC-75 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13DEC120S
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.776	14.283	11.865	16.653
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.25
	AVERAGE TEMPERATURE: 24.492			
	SINK TEMPERATURE: 10.210			
2	.774	13.691	12.337	17.316
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.75
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.92
	AVERAGE TEMPERATURE: 23.901			
	SINK TEMPERATURE: 10.210			
3	.772	13.510	12.472	17.506
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.71
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.78
	AVERAGE TEMPERATURE: 23.720			
	SINK TEMPERATURE: 10.210			
4	.779	14.217	11.958	16.784
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.34
	AVERAGE TEMPERATURE: 24.426			
	SINK TEMPERATURE: 10.210			
5	.796	13.692	12.689	17.810
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.75
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.89
	AVERAGE TEMPERATURE: 23.902			
	SINK TEMPERATURE: 10.210			
6	.792	13.385	12.902	18.109
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.68
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.57
	AVERAGE TEMPERATURE: 23.595			
	SINK TEMPERATURE: 10.210			
7	.768	14.279	11.739	16.476
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.88
	AVERAGE TEMPERATURE: 24.488			
	SINK TEMPERATURE: 10.210			
8	.796	13.728	12.647	17.751
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.76
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.88
	AVERAGE TEMPERATURE: 23.937			
	SINK TEMPERATURE: 10.210			
9	.795	13.416	12.922	18.137
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.69
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.72
	AVERAGE TEMPERATURE: 23.626			
	SINK TEMPERATURE: 10.210			

TABLE 4. REDUCED DATA FOR FC-75 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13DEC1620
THE POWER SETTING PER CHIP WAS: 1.3 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.256	19.496	14.108	19.801
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.18
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			58.97
	AVERAGE TEMPERATURE: 29.858			
	SINK TEMPERATURE: 10.362			
2	1.252	18.304	14.971	21.013
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.88
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			58.02
	AVERAGE TEMPERATURE: 28.666			
	SINK TEMPERATURE: 10.362			
3	1.250	17.922	15.259	21.418
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.78
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			57.66
	AVERAGE TEMPERATURE: 28.283			
	SINK TEMPERATURE: 10.362			
4	1.261	19.358	14.266	20.023
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.14
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.12
	AVERAGE TEMPERATURE: 29.720			
	SINK TEMPERATURE: 10.362			
5	1.288	18.447	15.288	21.459
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.91
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.80
	AVERAGE TEMPERATURE: 28.808			
	SINK TEMPERATURE: 10.362			
6	1.282	18.197	15.415	21.636
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.32
	AVERAGE TEMPERATURE: 28.559			
	SINK TEMPERATURE: 10.362			
7	1.244	19.315	14.102	19.793
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.13
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			58.29
	AVERAGE TEMPERATURE: 29.676			
	SINK TEMPERATURE: 10.362			
8	1.288	18.255	15.443	21.675
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.65
	AVERAGE TEMPERATURE: 28.617			
	SINK TEMPERATURE: 10.362			
9	1.287	17.705	15.905	22.324
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.72
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.24
	AVERAGE TEMPERATURE: 28.066			
	SINK TEMPERATURE: 10.362			

TABLE 5. REDUCED DATA FOR FC-75 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13DEC1950
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.657	23.608	15.413	21.633
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.28
	AVERAGE TEMPERATURE: 33.864			
	SINK TEMPERATURE: 10.256			
2	1.653	21.980	16.506	23.168
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.82
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			79.58
	AVERAGE TEMPERATURE: 32.216			
	SINK TEMPERATURE: 10.256			
3	1.649	21.254	17.010	23.874
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.63
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			76.79
	AVERAGE TEMPERATURE: 31.511			
	SINK TEMPERATURE: 10.256			
4	1.663	23.495	15.549	21.824
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.24
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.46
	AVERAGE TEMPERATURE: 33.741			
	SINK TEMPERATURE: 10.256			
5	1.701	22.261	16.760	23.524
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			82.17
	AVERAGE TEMPERATURE: 32.517			
	SINK TEMPERATURE: 10.256			
6	1.691	22.238	16.681	23.412
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.68
	AVERAGE TEMPERATURE: 32.494			
	SINK TEMPERATURE: 10.256			
7	1.640	23.464	15.342	21.534
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.23
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			80.29
	AVERAGE TEMPERATURE: 33.721			
	SINK TEMPERATURE: 10.256			
8	1.698	21.933	16.980	23.833
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.81
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.74
	AVERAGE TEMPERATURE: 32.189			
	SINK TEMPERATURE: 10.256			
9	1.697	21.117	17.618	24.728
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			80.96
	AVERAGE TEMPERATURE: 31.373			
	SINK TEMPERATURE: 10.256			

TABLE 6. REDUCED DATA FOR FC-75 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13DEC2240
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.185	28.871	16.672	23.400
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.82
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			113.62
	AVERAGE TEMPERATURE: 39.174			
	SINK TEMPERATURE: 10.303			
2	2.179	26.795	17.890	25.110
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.19
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			110.77
	AVERAGE TEMPERATURE: 37.097			
	SINK TEMPERATURE: 10.303			
3	2.174	25.970	18.412	25.842
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.95
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			109.56
	AVERAGE TEMPERATURE: 36.272			
	SINK TEMPERATURE: 10.303			
4	2.193	28.694	16.836	23.631
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.76
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			113.83
	AVERAGE TEMPERATURE: 38.996			
	SINK TEMPERATURE: 10.303			
5	2.242	27.053	18.236	25.595
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			114.30
	AVERAGE TEMPERATURE: 37.355			
	SINK TEMPERATURE: 10.303			
6	2.229	25.819	18.984	26.645
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.91
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			112.13
	AVERAGE TEMPERATURE: 36.122			
	SINK TEMPERATURE: 10.303			
7	2.163	28.376	16.784	23.557
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.66
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			111.86
	AVERAGE TEMPERATURE: 38.679			
	SINK TEMPERATURE: 10.303			
8	2.240	26.440	18.637	26.158
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			113.45
	AVERAGE TEMPERATURE: 36.742			
	SINK TEMPERATURE: 10.303			
9	2.239	25.408	19.372	27.191
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.79
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			112.13
	AVERAGE TEMPERATURE: 35.711			
	SINK TEMPERATURE: 10.303			

TABLE 7. REDUCED DATA FOR FC-75 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 14DEC0200
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.788	34.586	17.817	25.007
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			8.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			153.28
	AVERAGE TEMPERATURE: 44.624			
	SINK TEMPERATURE: 10.038			
2	2.780	32.098	19.109	26.820
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.79
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			148.80
	AVERAGE TEMPERATURE: 42.136			
	SINK TEMPERATURE: 10.038			
3	2.773	30.893	19.791	27.779
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			146.53
	AVERAGE TEMPERATURE: 40.931			
	SINK TEMPERATURE: 10.038			
4	2.798	34.254	18.047	25.330
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			8.49
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			153.25
	AVERAGE TEMPERATURE: 44.292			
	SINK TEMPERATURE: 10.038			
5	2.861	31.698	19.912	27.947
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.66
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			152.51
	AVERAGE TEMPERATURE: 41.736			
	SINK TEMPERATURE: 10.038			
6	2.843	30.671	20.439	28.688
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.33
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			149.91
	AVERAGE TEMPERATURE: 40.709			
	SINK TEMPERATURE: 10.038			
7	2.757	33.861	17.967	25.247
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			8.36
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			150.40
	AVERAGE TEMPERATURE: 43.899			
	SINK TEMPERATURE: 10.038			
8	2.857	31.223	20.177	28.320
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.51
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			151.50
	AVERAGE TEMPERATURE: 41.261			
	SINK TEMPERATURE: 10.038			
9	2.856	30.362	20.735	29.103
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.24
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			150.08
	AVERAGE TEMPERATURE: 40.400			
	SINK TEMPERATURE: 10.038			

TABLE 8. REDUCED DATA FOR FC-75 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 24DEC1945
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.114	4.466	5.521	7.749
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.81
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.46
	AVERAGE TEMPERATURE: 14.580			
	SINK TEMPERATURE: 10.114			
2	.113	4.490	5.464	7.669
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.81
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.44
	AVERAGE TEMPERATURE: 14.604			
	SINK TEMPERATURE: 10.114			
3	.113	4.533	5.395	7.573
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.82
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.43
	AVERAGE TEMPERATURE: 14.647			
	SINK TEMPERATURE: 10.114			
4	.114	4.401	5.604	7.866
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.80
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.46
	AVERAGE TEMPERATURE: 14.514			
	SINK TEMPERATURE: 10.114			
5	.116	4.408	5.710	8.014
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.80
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.55
	AVERAGE TEMPERATURE: 14.522			
	SINK TEMPERATURE: 10.114			
6	.115	4.458	5.613	7.878
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.81
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.53
	AVERAGE TEMPERATURE: 14.572			
	SINK TEMPERATURE: 10.114			
7	.112	4.302	5.649	7.929
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.78
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.39
	AVERAGE TEMPERATURE: 14.416			
	SINK TEMPERATURE: 10.114			
8	.116	4.532	5.559	7.802
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.82
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.57
	AVERAGE TEMPERATURE: 14.646			
	SINK TEMPERATURE: 10.114			
9	.116	4.540	5.550	7.789
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.82
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.57
	AVERAGE TEMPERATURE: 14.653			
	SINK TEMPERATURE: 10.114			

TABLE 9. REDUCED DATA FOR FC-75 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 19DEC1755
THE POWER SETTING PER CHIP WAS: 0.34 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.338	8.472	8.661	12.157
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.83
	AVERAGE TEMPERATURE: 18.390			
	SINK TEMPERATURE: 9.918			
2	.336	8.273	8.838	12.405
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.56
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.75
	AVERAGE TEMPERATURE: 18.191			
	SINK TEMPERATURE: 9.918			
3	.335	8.207	8.882	12.467
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.54
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.70
	AVERAGE TEMPERATURE: 18.125			
	SINK TEMPERATURE: 9.918			
4	.338	8.489	8.666	12.164
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.87
	AVERAGE TEMPERATURE: 18.407			
	SINK TEMPERATURE: 9.918			
5	.346	8.218	9.140	12.829
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.54
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.12
	AVERAGE TEMPERATURE: 18.136			
	SINK TEMPERATURE: 9.918			
6	.344	8.289	9.013	12.651
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.56
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.05
	AVERAGE TEMPERATURE: 18.207			
	SINK TEMPERATURE: 9.918			
7	.333	8.494	8.533	11.977
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.67
	AVERAGE TEMPERATURE: 18.412			
	SINK TEMPERATURE: 9.918			
8	.345	8.366	8.974	12.596
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.58
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.14
	AVERAGE TEMPERATURE: 18.284			
	SINK TEMPERATURE: 9.918			
9	.345	8.276	9.062	12.720
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.56
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.11
	AVERAGE TEMPERATURE: 18.195			
	SINK TEMPERATURE: 9.918			

TABLE 10. REDUCED DATA FOR FC-75 AND 30 MM SPACING

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 THE RAW Emf DATA ARE FROM THE FILE:    19DEC2115
 THE POWER SETTING PER CHIP WAS:   0.8 W
 THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP   QNET(W)  Tavg-Ts      Nu1        Nu2

 1       .774    14.305    11.819    16.589
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.90
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   34.29
   AVERAGE TEMPERATURE: 24.657
   SINK TEMPERATURE: 10.352

 2       .772    13.655    12.338    17.318
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.75
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   33.93
   AVERAGE TEMPERATURE: 24.007
   SINK TEMPERATURE: 10.352

 3       .770    13.463    12.487    17.526
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.71
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   33.78
   AVERAGE TEMPERATURE: 23.815
   SINK TEMPERATURE: 10.352

 4       .777    14.239    11.914    16.722
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.89
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   34.38
   AVERAGE TEMPERATURE: 24.591
   SINK TEMPERATURE: 10.352

 5       .794    13.725    12.620    17.713
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.77
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   34.91
   AVERAGE TEMPERATURE: 24.078
   SINK TEMPERATURE: 10.352

 6       .789    13.584    12.673    17.788
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.73
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   34.64
   AVERAGE TEMPERATURE: 23.936
   SINK TEMPERATURE: 10.352

 7       .765    14.270    11.697    16.417
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.89
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   33.84
   AVERAGE TEMPERATURE: 24.622
   SINK TEMPERATURE: 10.352

 8       .792    13.618    12.699    17.824
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.74
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   34.81
   AVERAGE TEMPERATURE: 23.970
   SINK TEMPERATURE: 10.352

 9       .792    13.423    12.877    18.073
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.70
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   34.72
   AVERAGE TEMPERATURE: 23.775
   SINK TEMPERATURE: 10.352
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TABLE 11. REDUCED DATA FOR FC-75 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 19DEC2300
THE POWER SETTING PER CHIP WAS: 1.3 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.250	19.467	14.063	19.738
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.17
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			58.71
	AVERAGE TEMPERATURE: 29.854			
	SINK TEMPERATURE: 10.387			
2	1.246	18.143	15.031	21.097
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.84
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			57.67
	AVERAGE TEMPERATURE: 28.531			
	SINK TEMPERATURE: 10.387			
3	1.243	17.749	15.322	21.505
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.74
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			57.26
	AVERAGE TEMPERATURE: 28.136			
	SINK TEMPERATURE: 10.387			
4	1.254	19.327	14.215	19.951
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.14
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			58.83
	AVERAGE TEMPERATURE: 29.715			
	SINK TEMPERATURE: 10.387			
5	1.282	18.473	15.196	21.329
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.92
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.57
	AVERAGE TEMPERATURE: 28.860			
	SINK TEMPERATURE: 10.387			
6	1.275	18.125	15.395	21.608
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			58.99
	AVERAGE TEMPERATURE: 28.512			
	SINK TEMPERATURE: 10.387			
7	1.236	19.304	14.023	19.683
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.13
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			57.95
	AVERAGE TEMPERATURE: 29.691			
	SINK TEMPERATURE: 10.387			
8	1.281	18.222	15.389	21.600
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.35
	AVERAGE TEMPERATURE: 28.609			
	SINK TEMPERATURE: 10.387			
9	1.280	17.805	15.736	22.086
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.75
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			59.03
	AVERAGE TEMPERATURE: 28.192			
	SINK TEMPERATURE: 10.387			

TABLE 12. REDUCED DATA FOR FC-75 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 21DEC1900
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.653	23.773	15.265	21.426
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.16
	AVERAGE TEMPERATURE: 34.003			
	SINK TEMPERATURE: 10.230			
2	1.648	22.177	16.303	22.883
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.88
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			78.52
	AVERAGE TEMPERATURE: 32.407			
	SINK TEMPERATURE: 10.230			
3	1.645	21.949	16.440	23.075
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.62
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			75.17
	AVERAGE TEMPERATURE: 32.179			
	SINK TEMPERATURE: 10.230			
4	1.659	23.708	15.365	21.567
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.30
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.41
	AVERAGE TEMPERATURE: 33.938			
	SINK TEMPERATURE: 10.230			
5	1.695	22.360	16.631	23.343
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.93
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.94
	AVERAGE TEMPERATURE: 32.590			
	SINK TEMPERATURE: 10.230			
6	1.685	21.725	17.013	23.879
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.76
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			80.90
	AVERAGE TEMPERATURE: 31.955			
	SINK TEMPERATURE: 10.230			
7	1.634	23.736	15.115	21.215
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.31
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			80.20
	AVERAGE TEMPERATURE: 33.966			
	SINK TEMPERATURE: 10.230			
8	1.693	22.117	16.787	23.562
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.61
	AVERAGE TEMPERATURE: 32.347			
	SINK TEMPERATURE: 10.230			
9	1.692	21.481	17.273	24.244
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.69
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			81.01
	AVERAGE TEMPERATURE: 31.711			
	SINK TEMPERATURE: 10.230			

TABLE 13. REDUCED DATA FOR FC-75 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 21DEC212S
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.180	29.628	16.217	22.762
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.03
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			114.00
	AVERAGE TEMPERATURE: 39.800			
	SINK TEMPERATURE: 10.172			
2	2.175	27.604	17.341	24.339
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.41
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			111.24
	AVERAGE TEMPERATURE: 37.776			
	SINK TEMPERATURE: 10.172			
3	2.170	26.929	17.732	24.888
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.21
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			110.19
	AVERAGE TEMPERATURE: 37.100			
	SINK TEMPERATURE: 10.172			
4	2.189	29.503	16.348	22.946
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.99
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			114.28
	AVERAGE TEMPERATURE: 39.675			
	SINK TEMPERATURE: 10.172			
5	2.238	27.782	17.730	24.885
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.47
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			114.68
	AVERAGE TEMPERATURE: 37.954			
	SINK TEMPERATURE: 10.172			
6	2.225	26.825	18.247	25.611
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.18
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			112.84
	AVERAGE TEMPERATURE: 36.997			
	SINK TEMPERATURE: 10.172			
7	2.157	29.272	16.237	22.790
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.92
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			112.35
	AVERAGE TEMPERATURE: 39.444			
	SINK TEMPERATURE: 10.172			
8	2.234	27.395	17.948	25.192
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.35
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			114.02
	AVERAGE TEMPERATURE: 37.567			
	SINK TEMPERATURE: 10.172			
9	2.234	26.586	18.482	25.941
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.11
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			113.00
	AVERAGE TEMPERATURE: 36.758			
	SINK TEMPERATURE: 10.172			

TABLE 14. REDUCED DATA FOR FC-75 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 21DEC2340
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.791	35.184	17.542	24.621
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 8.83			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 154.91			
	AVERAGE TEMPERATURE: 45.374			
	SINK TEMPERATURE: 10.190			
2	2.783	32.753	18.761	26.332
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 8.02			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 150.52			
	AVERAGE TEMPERATURE: 42.943			
	SINK TEMPERATURE: 10.190			
3	2.778	31.890	19.221	26.978
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 7.74			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 148.85			
	AVERAGE TEMPERATURE: 42.080			
	SINK TEMPERATURE: 10.190			
4	2.802	34.976	17.713	24.861
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 8.76			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 155.17			
	AVERAGE TEMPERATURE: 45.166			
	SINK TEMPERATURE: 10.190			
5	2.866	32.795	19.294	27.080
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 8.04			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 155.06			
	AVERAGE TEMPERATURE: 42.985			
	SINK TEMPERATURE: 10.190			
6	2.849	31.674	19.849	27.860
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 7.67			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 152.34			
	AVERAGE TEMPERATURE: 41.864			
	SINK TEMPERATURE: 10.190			
7	2.763	34.610	17.647	24.769
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 8.64			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 152.42			
	AVERAGE TEMPERATURE: 44.800			
	SINK TEMPERATURE: 10.190			
8	2.861	32.709	19.311	27.104
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 8.01			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 154.66			
	AVERAGE TEMPERATURE: 42.899			
	SINK TEMPERATURE: 10.190			
9	2.861	31.416	20.089	28.197
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 7.59			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 152.53			
	AVERAGE TEMPERATURE: 41.606			
	SINK TEMPERATURE: 10.190			

TABLE 15. REDUCED DATA FOR FC-75 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 22DEC0200
THE POWER SETTING PER CHIP WAS: 3.55 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	3.449	40.914	18.712	26.263
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.89			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 203.86			
	AVERAGE TEMPERATURE: 51.251			
	SINK TEMPERATURE: 10.337			
2	3.438	38.073	20.007	28.081
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.86			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 197.29			
	AVERAGE TEMPERATURE: 48.410			
	SINK TEMPERATURE: 10.337			
3	3.429	36.710	20.680	29.026
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.38			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 194.01			
	AVERAGE TEMPERATURE: 47.047			
	SINK TEMPERATURE: 10.337			
4	3.458	40.842	18.795	26.381
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.87			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 204.27			
	AVERAGE TEMPERATURE: 51.179			
	SINK TEMPERATURE: 10.337			
5	3.537	37.556	20.864	29.284
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.68			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 201.92			
	AVERAGE TEMPERATURE: 47.893			
	SINK TEMPERATURE: 10.337			
6	3.516	36.790	21.162	29.703
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.41			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 199.12			
	AVERAGE TEMPERATURE: 47.127			
	SINK TEMPERATURE: 10.337			
7	3.411	40.358	18.757	26.327
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.69			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 200.49			
	AVERAGE TEMPERATURE: 50.695			
	SINK TEMPERATURE: 10.337			
8	3.532	38.186	20.496	28.768
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.90			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 202.94			
	AVERAGE TEMPERATURE: 48.523			
	SINK TEMPERATURE: 10.337			
9	3.533	36.567	21.391	30.023
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.33			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 199.61			
	AVERAGE TEMPERATURE: 46.904			
	SINK TEMPERATURE: 10.337			

TABLE 16. REDUCED DATA FOR FC-75 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 15DEC0220
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM.LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.113	5.751	4.272	5.996
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.52
	AVERAGE TEMPERATURE: 15.847			
	SINK TEMPERATURE: 10.086			
2	.113	5.760	4.259	5.979
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.50
	AVERAGE TEMPERATURE: 15.846			
	SINK TEMPERATURE: 10.086			
3	.113	5.779	4.233	5.942
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.49
	AVERAGE TEMPERATURE: 15.865			
	SINK TEMPERATURE: 10.086			
4	.114	5.700	4.333	6.082
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.53
	AVERAGE TEMPERATURE: 15.786			
	SINK TEMPERATURE: 10.086			
5	.116	5.630	4.485	6.295
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.03
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.63
	AVERAGE TEMPERATURE: 15.716			
	SINK TEMPERATURE: 10.086			
6	.116	5.708	4.396	6.170
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.60
	AVERAGE TEMPERATURE: 15.794			
	SINK TEMPERATURE: 10.086			
7	.112	5.687	4.285	6.015
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.04
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.47
	AVERAGE TEMPERATURE: 15.773			
	SINK TEMPERATURE: 10.086			
8	.116	5.812	4.349	6.104
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.07
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.64
	AVERAGE TEMPERATURE: 15.899			
	SINK TEMPERATURE: 10.086			
9	.116	5.814	4.344	6.096
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.07
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.64
	AVERAGE TEMPERATURE: 15.900			
	SINK TEMPERATURE: 10.086			

TABLE 17. REDUCED DATA FOR FC-75 AND 18 MM SPACING

```
 THE RAW Emf DATA ARE FROM THE FILE:     15DEC044S
 THE POWER SETTING PER CHIP WAS:    0.34 W
 THE DISTANCE TO THE FRONT WALL WAS 18 MM,LIQUID WAS FC-75

CHIP    QNET(W)  Tavg-Ts       Nu1         Nu2

 1        .331     9.370      7.690     10.793
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.79
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.80
   AVERAGE TEMPERATURE: 19.561
   SINK TEMPERATURE: 10.191

 2        .330     9.081      7.902     11.091
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.73
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.70
   AVERAGE TEMPERATURE: 19.272
   SINK TEMPERATURE: 10.191

 3        .329     9.073      7.886     11.069
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.73
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.66
   AVERAGE TEMPERATURE: 19.264
   SINK TEMPERATURE: 10.191

 4        .332     9.288      7.777     10.916
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.78
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.82
   AVERAGE TEMPERATURE: 19.479
   SINK TEMPERATURE: 10.191

 5        .339     9.020      8.184     11.486
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.72
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.08
   AVERAGE TEMPERATURE: 19.211
   SINK TEMPERATURE: 10.191

 6        .337     9.060      8.101     11.370
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.73
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.01
   AVERAGE TEMPERATURE: 19.251
   SINK TEMPERATURE: 10.191

 7        .327     9.324      7.638     10.720
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.78
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.63
   AVERAGE TEMPERATURE: 19.515
   SINK TEMPERATURE: 10.191

 8        .339     9.127      8.092     11.357
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.74
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.11
   AVERAGE TEMPERATURE: 19.318
   SINK TEMPERATURE: 10.191

 9        .340     9.082      8.143     11.429
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    1.73
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.12
   AVERAGE TEMPERATURE: 19.273
   SINK TEMPERATURE: 10.191
```

TABLE 18. REDUCED DATA FOR FC-75 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 15DEC1705
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.773	15.989	10.553	14.812
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.48
	AVERAGE TEMPERATURE: 25.856			
	SINK TEMPERATURE: 9.867			
2	.770	15.179	11.072	15.541
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.07
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.05
	AVERAGE TEMPERATURE: 25.045			
	SINK TEMPERATURE: 9.867			
3	.768	15.034	11.150	15.650
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.04
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.91
	AVERAGE TEMPERATURE: 24.901			
	SINK TEMPERATURE: 9.867			
4	.775	15.927	10.622	14.909
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.25
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.55
	AVERAGE TEMPERATURE: 25.794			
	SINK TEMPERATURE: 9.867			
5	.792	15.396	11.229	15.761
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.13
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.11
	AVERAGE TEMPERATURE: 25.263			
	SINK TEMPERATURE: 9.867			
6	.788	15.296	11.241	15.778
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.88
	AVERAGE TEMPERATURE: 25.163			
	SINK TEMPERATURE: 9.867			
7	.764	15.815	10.548	14.806
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.23
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.03
	AVERAGE TEMPERATURE: 25.682			
	SINK TEMPERATURE: 9.867			
8	.791	15.367	11.240	15.776
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.12
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.06
	AVERAGE TEMPERATURE: 25.234			
	SINK TEMPERATURE: 9.867			
9	.791	15.081	11.447	16.067
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.94
	AVERAGE TEMPERATURE: 24.948			
	SINK TEMPERATURE: 9.867			

TABLE 19. REDUCED DATA FOR FC-75 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 150EC2000
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.651	26.608	13.647	19.154
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.13
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			83.70
	AVERAGE TEMPERATURE: 36.885			
	SINK TEMPERATURE: 10.277			
2	1.646	25.690	14.087	19.772
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			82.64
	AVERAGE TEMPERATURE: 35.967			
	SINK TEMPERATURE: 10.277			
3	1.642	25.441	14.186	19.910
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.79
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			82.20
	AVERAGE TEMPERATURE: 35.718			
	SINK TEMPERATURE: 10.277			
4	1.656	26.446	13.772	19.329
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			83.82
	AVERAGE TEMPERATURE: 36.723			
	SINK TEMPERATURE: 10.277			
5	1.692	25.936	14.349	20.139
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.94
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			85.20
	AVERAGE TEMPERATURE: 36.213			
	SINK TEMPERATURE: 10.277			
6	1.682	25.646	14.422	20.243
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			84.42
	AVERAGE TEMPERATURE: 35.922			
	SINK TEMPERATURE: 10.277			
7	1.631	26.311	13.634	19.136
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			82.44
	AVERAGE TEMPERATURE: 36.588			
	SINK TEMPERATURE: 10.277			
8	1.690	26.355	14.102	19.794
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			85.45
	AVERAGE TEMPERATURE: 36.632			
	SINK TEMPERATURE: 10.277			
9	1.689	25.566	14.525	20.387
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			84.68
	AVERAGE TEMPERATURE: 35.843			
	SINK TEMPERATURE: 10.277			

TABLE 20. REDUCED DATA FOR FC-75 AND 18 MM SPACING

```
 THE RAW Emf DATA ARE FROM THE FILE:    15DEC2315
 THE POWER SETTING PER CHIP WAS:   2.25 W
 THE DISTANCE TO THE FRONT WALL WAS 18 MM,LIQUID WAS FC-75

CHIP   QNET(W)  Tavg-Ts      Nu1        Nu2

 1      2.175    31.844    15.068    21.148
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.71
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  116.22
   AVERAGE TEMPERATURE: 41.932
   SINK TEMPERATURE: 10.088

 2      2.167    31.288    15.277    21.443
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.54
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  115.14
   AVERAGE TEMPERATURE: 41.376
   SINK TEMPERATURE: 10.088

 3      2.162    30.933    15.413    21.634
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.42
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  114.43
   AVERAGE TEMPERATURE: 41.021
   SINK TEMPERATURE: 10.088

 4      2.182    31.665    15.200    21.335
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.66
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  116.38
   AVERAGE TEMPERATURE: 41.753
   SINK TEMPERATURE: 10.088

 5      2.230    31.674    15.533    21.802
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.66
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  118.97
   AVERAGE TEMPERATURE: 41.762
   SINK TEMPERATURE: 10.088

 6      2.217    31.173    15.688    22.019
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.50
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  117.65
   AVERAGE TEMPERATURE: 41.261
   SINK TEMPERATURE: 10.088

 7      2.150    31.496    15.060    21.138
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.60
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  114.50
   AVERAGE TEMPERATURE: 41.584
   SINK TEMPERATURE: 10.088

 8      2.227    32.178    15.276    21.441
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.82
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  119.47
   AVERAGE TEMPERATURE: 42.266
   SINK TEMPERATURE: 10.088

 9      2.227    31.178    15.755    22.113
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.50
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  118.19
   AVERAGE TEMPERATURE: 41.266
   SINK TEMPERATURE: 10.088
```

TABLE 21. REDUCED DATA FOR FC-75 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 16DEC0050
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.788	36.201	17.044	23.922
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.18	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		156.44	
	AVERAGE TEMPERATURE: 46.396			
	SINK TEMPERATURE: 10.196			
2	2.779	36.930	16.661	23.385
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.43	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		157.14	
	AVERAGE TEMPERATURE: 47.126			
	SINK TEMPERATURE: 10.196			
3	2.773	36.008	17.038	23.913
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.11	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		155.26	
	AVERAGE TEMPERATURE: 46.204			
	SINK TEMPERATURE: 10.196			
4	2.797	35.940	17.218	24.167
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.09	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		156.50	
	AVERAGE TEMPERATURE: 46.136			
	SINK TEMPERATURE: 10.196			
5	2.859	37.221	17.006	23.870
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.53	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		162.13	
	AVERAGE TEMPERATURE: 47.417			
	SINK TEMPERATURE: 10.196			
6	2.841	36.198	17.368	24.378
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.18	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		159.41	
	AVERAGE TEMPERATURE: 46.394			
	SINK TEMPERATURE: 10.196			
7	2.756	35.738	17.059	23.943
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.02	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		153.88	
	AVERAGE TEMPERATURE: 45.934			
	SINK TEMPERATURE: 10.196			
8	2.853	37.512	16.846	23.645
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:		9.64	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		162.32	
	AVERAGE TEMPERATURE: 47.707			
	SINK TEMPERATURE: 10.196			
9	2.854	36.201	17.445	24.485
	TEMP.BASED RAYLEIGH NUMBER * E-S IS:		9.18	
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:		160.13	
	AVERAGE TEMPERATURE: 46.397			
	SINK TEMPERATURE: 10.196			

TABLE 22. REDUCED DATA FOR FC-75 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 18DEC1930
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.114	7.494	3.295	4.625
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.62
	AVERAGE TEMPERATURE: 17.537			
	SINK TEMPERATURE: 10.042			
2	.113	7.481	3.289	4.617
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.60
	AVERAGE TEMPERATURE: 17.523			
	SINK TEMPERATURE: 10.042			
3	.113	7.483	3.284	4.609
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.59
	AVERAGE TEMPERATURE: 17.525			
	SINK TEMPERATURE: 10.042			
4	.114	7.366	3.361	4.717
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.38
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.62
	AVERAGE TEMPERATURE: 17.408			
	SINK TEMPERATURE: 10.042			
5	.116	7.330	3.451	4.844
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.37
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.72
	AVERAGE TEMPERATURE: 17.372			
	SINK TEMPERATURE: 10.042			
6	.116	7.375	3.415	4.794
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.38
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.70
	AVERAGE TEMPERATURE: 17.418			
	SINK TEMPERATURE: 10.042			
7	.113	7.467	3.275	4.595
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.57
	AVERAGE TEMPERATURE: 17.509			
	SINK TEMPERATURE: 10.042			
8	.116	7.453	3.396	4.766
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.39
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.73
	AVERAGE TEMPERATURE: 17.496			
	SINK TEMPERATURE: 10.042			
9	.116	7.454	3.393	4.762
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.39
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			4.73
	AVERAGE TEMPERATURE: 17.496			
	SINK TEMPERATURE: 10.042			

TABLE 23. REDUCED DATA FOR FC-75 AND 11 MM SPACING

```
 THE RAW Emf DATA ARE FROM THE FILE:     16DEC1900
 THE POWER SETTING PER CHIP WAS:    0.34 W
 THE DISTANCE TO THE FRONT WALL WAS 11 MM,LIQUID WAS FC-75

CHIP    QNET(W)  Tavg-Ts       Nu1         Nu2

 1        .332     11.061      6.535       9.172
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.15
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.05
   AVERAGE TEMPERATURE: 21.092
   SINK TEMPERATURE: 10.031

 2        .331     10.906      6.606       9.272
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.12
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.98
   AVERAGE TEMPERATURE: 20.937
   SINK TEMPERATURE: 10.031

 3        .330     10.947      6.566       9.216
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.13
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.96
   AVERAGE TEMPERATURE: 20.977
   SINK TEMPERATURE: 10.031

 4        .333     11.084      6.547       9.190
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.16
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.11
   AVERAGE TEMPERATURE: 21.114
   SINK TEMPERATURE: 10.031

 5        .341     10.858      6.836       9.595
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.11
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.40
   AVERAGE TEMPERATURE: 20.889
   SINK TEMPERATURE: 10.031

 6        .339     10.895      6.780       9.516
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.11
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.33
   AVERAGE TEMPERATURE: 20.925
   SINK TEMPERATURE: 10.031

 7        .329     10.927      6.559       9.206
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.12
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    13.91
   AVERAGE TEMPERATURE: 20.957
   SINK TEMPERATURE: 10.031

 8        .341     10.957      6.779       9.515
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.13
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.42
   AVERAGE TEMPERATURE: 20.987
   SINK TEMPERATURE: 10.031

 9        .341     10.935      6.786       9.524
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    2.12
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    14.41
   AVERAGE TEMPERATURE: 20.966
   SINK TEMPERATURE: 10.031
```

TABLE 24. REDUCED DATA FOR FC-75 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 16DEC2235
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.776	18.389	9.237	12.965
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.78
	AVERAGE TEMPERATURE: 28.467			
	SINK TEMPERATURE: 10.078			
2	.774	17.638	9.603	13.478
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.69
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.39
	AVERAGE TEMFERATURE: 27.716			
	SINK TEMPERATURE: 10.078			
3	.773	17.504	9.659	13.557
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.65
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.28
	AVERAGE TEMPERATURE: 27.582			
	SINK TEMPERATURE: 10.078			
4	.780	18.274	9.342	13.113
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.84
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.92
	AVERAGE TEMPERATURE: 28.352			
	SINK TEMPERATURE: 10.078			
5	.798	17.677	9.868	13.850
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.70
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.46
	AVERAGE TEMPERATURE: 27.755			
	SINK TEMPERATURE: 10.078			
6	.793	17.592	9.864	13.844
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.67
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.24
	AVERAGE TEMPERATURE: 27.670			
	SINK TEMPERATURE: 10.078			
7	.770	18.098	9.307	13.063
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.80
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.37
	AVERAGE TEMPERATURE: 28.176			
	SINK TEMPERATURE: 10.078			
8	.798	17.661	9.876	13.862
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.69
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.45
	AVERAGE TEMPERATURE: 27.739			
	SINK TEMPERATURE: 10.078			
9	.797	17.437	9.991	14.023
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.64
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.32
	AVERAGE TEMPERATURE: 27.515			
	SINK TEMPERATURE: 10.078			

TABLE 25. REDUCED DATA FOR FC-75 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 18DEC1615
THE POWER SETTING PER CHIP WAS: 1.3 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.255	25.829	10.681	14.991
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			62.66
	AVERAGE TEMPERATURE: 35.782			
	SINK TEMPERATURE: 9.954			
2	1.252	25.853	10.641	14.935
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			62.50
	AVERAGE TEMPERATURE: 35.806			
	SINK TEMPERATURE: 9.954			
3	1.249	25.239	10.868	15.255
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.70
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			61.93
	AVERAGE TEMPERATURE: 35.193			
	SINK TEMPERATURE: 9.954			
4	1.260	25.866	10.706	15.026
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.88
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			62.93
	AVERAGE TEMPERATURE: 35.820			
	SINK TEMPERATURE: 9.954			
5	1.288	25.513	11.092	15.569
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.78
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			64.07
	AVERAGE TEMPERATURE: 35.467			
	SINK TEMPERATURE: 9.954			
6	1.280	27.507	10.241	14.374
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.36
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			65.11
	AVERAGE TEMPERATURE: 37.460			
	SINK TEMPERATURE: 9.954			
7	1.241	26.096	10.455	14.675
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.94
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			62.15
	AVERAGE TEMPERATURE: 36.049			
	SINK TEMPERATURE: 9.954			
8	1.286	26.212	10.789	15.143
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.98
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			64.49
	AVERAGE TEMPERATURE: 36.165			
	SINK TEMPERATURE: 9.954			
9	1.286	25.309	11.162	15.666
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.72
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			63.82
	AVERAGE TEMPERATURE: 35.263			
	SINK TEMPERATURE: 9.954			

TABLE 26. REDUCED DATA FOR FC-75 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 17DEC0100
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.647	28.683	12.642	17.744
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.71
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			84.86
	AVERAGE TEMPERATURE: 38.659			
	SINK TEMPERATURE: 9.977			
2	1.642	29.264	12.357	17.344
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			85.14
	AVERAGE TEMPERATURE: 39.241			
	SINK TEMPERATURE: 9.977			
3	1.639	28.716	12.566	17.637
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.72
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			84.48
	AVERAGE TEMPERATURE: 38.692			
	SINK TEMPERATURE: 9.977			
4	1.654	28.527	12.764	17.915
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.67
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			85.08
	AVERAGE TEMPERATURE: 38.504			
	SINK TEMPERATURE: 9.977			
5	1.690	29.015	12.828	18.005
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.81
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			87.41
	AVERAGE TEMPERATURE: 38.992			
	SINK TEMPERATURE: 9.977			
6	1.680	28.670	12.905	18.113
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.71
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			86.58
	AVERAGE TEMPERATURE: 38.647			
	SINK TEMPERATURE: 9.977			
7	1.630	28.453	12.612	17.701
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.64
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			83.78
	AVERAGE TEMPERATURE: 38.430			
	SINK TEMPERATURE: 9.977			
8	1.688	30.082	12.367	17.358
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			7.14
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			88.32
	AVERAGE TEMPERATURE: 40.059			
	SINK TEMPERATURE: 9.977			
9	1.687	28.612	12.896	18.101
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.75
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			87.07
	AVERAGE TEMPERATURE: 38.788			
	SINK TEMPERATURE: 9.977			

TABLE 27. REDUCED DATA FOR FC-75 AND 11 MM SPACING

```
 THE RAW Emf DATA ARE FROM THE FILE:     17DEC1830
 THE POWER SETTING PER CHIP WAS:    2.25 W
 THE DISTANCE TO THE FRONT WALL WAS 11 MM,LIQUID WAS FC-75

CHIP    QNET(W)  Tavg-Ts       Nu1        Nu2

 1       2.181    33.920    14.208    19.942
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.39
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  119.26
   AVERAGE TEMPERATURE: 44.033
   SINK TEMPERATURE: 10.113

 2       2.174    35.537    13.531    18.992
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.94
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  120.53
   AVERAGE TEMPERATURE: 45.650
   SINK TEMPERATURE: 10.113

 3       2.169    34.671    13.828    19.408
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.64
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  119.53
   AVERAGE TEMPERATURE: 44.784
   SINK TEMPERATURE: 10.113

 4       2.189    33.734    14.332    20.116
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.33
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  119.42
   AVERAGE TEMPERATURE: 43.847
   SINK TEMPERATURE: 10.113

 5       2.237    35.539    13.922    19.540
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.94
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  124.42
   AVERAGE TEMPERATURE: 45.651
   SINK TEMPERATURE: 10.113

 6       2.225    35.268    13.948    19.577
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.85
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  123.38
   AVERAGE TEMPERATURE: 45.380
   SINK TEMPERATURE: 10.113

 7       2.158    33.570    14.199    19.929
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.28
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  117.54
   AVERAGE TEMPERATURE: 43.683
   SINK TEMPERATURE: 10.113

 8       2.235    36.440    13.574    19.051
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    9.25
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  125.51
   AVERAGE TEMPERATURE: 46.553
   SINK TEMPERATURE: 10.113

 9       2.235    34.871    14.170    19.888
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:    8.71
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:  123.44
   AVERAGE TEMPERATURE: 44.984
   SINK TEMPERATURE: 10.113
```

TABLE 28. REDUCED DATA FOR FC-75 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 17DEC2350
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.782	39.181	15.737	22.088
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.18			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 160.16			
	AVERAGE TEMPERATURE: 49.110			
	SINK TEMPERATURE: 9.929			
2	2.773	41.647	14.778	20.742
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 11.08			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 163.75			
	AVERAGE TEMPERATURE: 51.577			
	SINK TEMPERATURE: 9.929			
3	2.766	40.625	15.105	21.201
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.70			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 161.65			
	AVERAGE TEMPERATURE: 50.554			
	SINK TEMPERATURE: 9.929			
4	2.790	38.896	15.896	22.311
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.07			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 160.15			
	AVERAGE TEMPERATURE: 48.825			
	SINK TEMPERATURE: 9.929			
5	2.853	40.867	15.486	21.736
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.79			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 167.12			
	AVERAGE TEMPERATURE: 50.797			
	SINK TEMPERATURE: 9.929			
6	2.836	40.801	15.421	21.645
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.77			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 166.04			
	AVERAGE TEMPERATURE: 50.730			
	SINK TEMPERATURE: 9.929			
7	2.752	38.637	15.778	22.145
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.98			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 157.50			
	AVERAGE TEMPERATURE: 48.567			
	SINK TEMPERATURE: 9.929			
8	2.849	41.457	15.252	21.408
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 11.01			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 167.93			
	AVERAGE TEMPERATURE: 51.387			
	SINK TEMPERATURE: 9.929			
9	2.849	40.575	15.577	21.864
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.68			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 166.42			
	AVERAGE TEMPERATURE: 50.504			
	SINK TEMPERATURE: 9.929			

TABLE 29. REDUCED DATA FOR FC-75 AND 7 MM SPACING

```
 THE RAW Emf DATA ARE FROM THE FILE:    25DEC2115
 THE POWER SETTING PER CHIP WAS:   0.115 W
 THE DISTANCE TO THE FRONT WALL WAS 7  MM,LIQUID WAS FC-75

CHIP   QNET(W)  Tavg-Ts      Nu1        Nu2

 1       .113     7.545     3.257     4.572
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.41
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.60
   AVERAGE TEMPERATURE: 17.564
   SINK TEMPERATURE: 10.019

 2       .113     7.656     3.202     4.495
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.43
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.59
   AVERAGE TEMPERATURE: 17.675
   SINK TEMPERATURE: 10.019

 3       .113     7.279     3.361     4.717
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.36
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.56
   AVERAGE TEMPERATURE: 17.298
   SINK TEMPERATURE: 10.019

 4       .114     7.315     3.373     4.735
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.36
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.60
   AVERAGE TEMPERATURE: 17.334
   SINK TEMPERATURE: 10.019

 5       .116     7.527     3.347     4.697
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.41
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.71
   AVERAGE TEMPERATURE: 17.546
   SINK TEMPERATURE: 10.019

 6       .115     7.144     3.504     4.919
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.33
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.66
   AVERAGE TEMPERATURE: 17.163
   SINK TEMPERATURE: 10.019

 7       .112     6.895     3.519     4.939
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.28
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.50
   AVERAGE TEMPERATURE: 16.914
   SINK TEMPERATURE: 10.019

 8       .116     7.497     3.349     4.701
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.40
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.69
   AVERAGE TEMPERATURE: 17.516
   SINK TEMPERATURE: 10.019

 9       .115     7.299     3.437     4.824
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   1.36
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    4.68
   AVERAGE TEMPERATURE: 17.318
   SINK TEMPERATURE: 10.019
```

TABLE 30. REDUCED DATA FOR FC-75 AND 7 MM SPACING

```
 THE RAW Emf DATA ARE FROM THE FILE:    25DEC2340
 THE POWER SETTING PER CHIP WAS:   0.34 W
 THE DISTANCE TO THE FRONT WALL WAS 7  MM,LIQUID WAS FC-75

CHIP   QNET(W)  Tavg-Ts      Nu1        Nu2

 1       .330    11.877     6.059      8.505
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.33
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   14.10
   AVERAGE TEMPERATURE: 21.848
   SINK TEMPERATURE:  9.971

 2       .329    11.943     6.005      8.429
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.34
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   14.06
   AVERAGE TEMPERATURE: 21.914
   SINK TEMPERATURE:  9.971

 3       .328    11.302     6.330      8.885
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.20
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   13.93
   AVERAGE TEMPERATURE: 21.273
   SINK TEMPERATURE:  9.971

 4       .331    11.525     6.263      8.791
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.25
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   14.09
   AVERAGE TEMPERATURE: 21.496
   SINK TEMPERATURE:  9.971

 5       .339    11.807     6.247      8.768
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.31
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   14.44
   AVERAGE TEMPERATURE: 21.778
   SINK TEMPERATURE:  9.971

 6       .337    11.335     6.466      9.076
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.21
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   14.27
   AVERAGE TEMPERATURE: 21.306
   SINK TEMPERATURE:  9.971

 7       .326    11.237     6.318      8.868
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.19
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   13.81
   AVERAGE TEMPERATURE: 21.208
   SINK TEMPERATURE:  9.971

 8       .338    11.705     6.292      8.831
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.29
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   14.40
   AVERAGE TEMPERATURE: 21.676
   SINK TEMPERATURE:  9.971

 9       .338    11.395     6.464      9.073
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   2.22
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   14.35
   AVERAGE TEMPERATURE: 21.366
   SINK TEMPERATURE:  9.971
```

TABLE 31. REDUCED DATA FOR FC-75 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 26DEC0300
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.766	19.503	8.601	12.072
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.15
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.68
	AVERAGE TEMPERATURE: 29.483			
	SINK TEMPERATURE: 9.980			
2	.764	19.817	8.440	11.846
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.23
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.69
	AVERAGE TEMPERATURE: 29.797			
	SINK TEMPERATURE: 9.980			
3	.762	19.432	8.583	12.047
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.13
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.45
	AVERAGE TEMPERATURE: 29.412			
	SINK TEMPERATURE: 9.980			
4	.768	18.750	8.966	12.584
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.96
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.47
	AVERAGE TEMPERATURE: 28.731			
	SINK TEMPERATURE: 9.980			
5	.785	19.711	8.720	12.240
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.20
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.64
	AVERAGE TEMPERATURE: 29.691			
	SINK TEMPERATURE: 9.980			
6	.780	19.011	8.983	12.608
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.02
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.13
	AVERAGE TEMPERATURE: 28.991			
	SINK TEMPERATURE: 9.980			
7	.756	18.316	9.034	12.680
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.75
	AVERAGE TEMPERATURE: 28.296			
	SINK TEMPERATURE: 9.980			
8	.784	19.308	8.887	12.473
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.42
	AVERAGE TEMPERATURE: 29.288			
	SINK TEMPERATURE: 9.980			
9	.784	18.722	9.162	12.859
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.95
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.18
	AVERAGE TEMPERATURE: 28.702			
	SINK TEMPERATURE: 9.980			

TABLE 32. REDUCED DATA FOR FC-75 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 26DEC1825
THE POWER SETTING PER CHIP WAS: 1.3 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.243	26.970	10.142	14.235
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.23
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			63.17
	AVERAGE TEMPERATURE: 37.156			
	SINK TEMPERATURE: 10.187			
2	1.239	27.642	9.867	13.849
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.43
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			63.43
	AVERAGE TEMPERATURE: 37.829			
	SINK TEMPERATURE: 10.187			
3	1.237	26.655	10.207	14.326
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.14
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			62.63
	AVERAGE TEMPERATURE: 36.842			
	SINK TEMPERATURE: 10.187			
4	1.248	25.693	10.681	14.991
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			62.55
	AVERAGE TEMPERATURE: 35.880			
	SINK TEMPERATURE: 10.187			
5	1.276	27.544	10.195	14.310
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			65.24
	AVERAGE TEMPERATURE: 37.731			
	SINK TEMPERATURE: 10.187			
6	1.268	26.657	10.465	14.688
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.14
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			64.22
	AVERAGE TEMPERATURE: 36.844			
	SINK TEMPERATURE: 10.187			
7	1.229	24.717	10.924	15.333
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.58
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			60.92
	AVERAGE TEMPERATURE: 34.903			
	SINK TEMPERATURE: 10.187			
8	1.274	27.000	10.378	14.566
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			6.24
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			64.73
	AVERAGE TEMPERATURE: 37.187			
	SINK TEMPERATURE: 10.187			
9	1.274	25.833	10.840	15.214
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			63.92
	AVERAGE TEMPERATURE: 36.020			
	SINK TEMPERATURE: 10.167			

TABLE 33. REDUCED DATA FOR FC-75 AND 7 MM SPACING

```
 THE RAW Emf DATA ARE FROM THE FILE:    27DEC2400
 THE POWER SETTING PER CHIP WAS:   1.7 W
 THE DISTANCE TO THE FRONT WALL WAS 7  MM,LIQUID WAS FC-75

CHIP    QNET(W)  Tavg-Ts      Nu1        Nu2

 1       1.638    32.918    10.987    15.421
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   8.02
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   88.15
   AVERAGE TEMPERATURE: 42.777
   SINK TEMPERATURE:  9.859

 2       1.633    33.946    10.628    14.917
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   8.36
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   88.85
   AVERAGE TEMPERATURE: 43.805
   SINK TEMPERATURE:  9.859

 3       1.630    32.853    10.949    15.368
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   8.00
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   87.62
   AVERAGE TEMPERATURE: 42.712
   SINK TEMPERATURE:  9.859

 4       1.645    31.233    11.610    16.296
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.48
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   86.89
   AVERAGE TEMPERATURE: 41.092
   SINK TEMPERATURE:  9.859

 5       1.682    33.726    11.011    15.454
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   8.29
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   91.25
   AVERAGE TEMPERATURE: 43.586
   SINK TEMPERATURE:  9.859

 6       1.672    31.766    11.613    16.299
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.65
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   88.87
   AVERAGE TEMPERATURE: 41.626
   SINK TEMPERATURE:  9.859

 7       1.622    29.756    12.009    16.856
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.02
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   84.35
   AVERAGE TEMPERATURE: 39.615
   SINK TEMPERATURE:  9.859

 8       1.680    33.198    11.172    15.680
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   8.11
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   90.65
   AVERAGE TEMPERATURE: 43.058
   SINK TEMPERATURE:  9.859

 9       1.680    32.325    11.467    16.095
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:   7.83
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:   89.81
   AVERAGE TEMPERATURE: 42.164
   SINK TEMPERATURE:  9.859
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TABLE 34. REDUCED DATA FOR FC-75 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 27DEC2330
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.158	38.828	12.319	17.290
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.07			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 124.03			
	AVERAGE TEMPERATURE: 48.847			
	SINK TEMPERATURE: 10.019			
2	2.151	41.212	11.562	16.256
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.94			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 126.68			
	AVERAGE TEMPERATURE: 51.231			
	SINK TEMPERATURE: 10.019			
3	2.146	39.767	11.966	16.795
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.41			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 124.53			
	AVERAGE TEMPERATURE: 49.786			
	SINK TEMPERATURE: 10.019			
4	2.165	37.422	12.807	17.976
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.57			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 122.57			
	AVERAGE TEMPERATURE: 47.441			
	SINK TEMPERATURE: 10.019			
5	2.212	41.430	11.852	16.635
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 11.02			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 130.60			
	AVERAGE TEMPERATURE: 51.449			
	SINK TEMPERATURE: 10.019			
6	2.198	39.311	12.394	17.397
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.24			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 126.94			
	AVERAGE TEMPERATURE: 49.330			
	SINK TEMPERATURE: 10.019			
7	2.132	36.728	12.844	18.028
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 9.33			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 119.82			
	AVERAGE TEMPERATURE: 46.747			
	SINK TEMPERATURE: 10.019			
8	2.207	39.949	12.251	17.196
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.47			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 128.31			
	AVERAGE TEMPERATURE: 49.968			
	SINK TEMPERATURE: 10.019			
9	2.206	39.768	12.302	17.267
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 10.41			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 128.04			
	AVERAGE TEMPERATURE: 49.787			
	SINK TEMPERATURE: 10.019			

TABLE 35. REDUCED DATA FOR FC-75 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 28DEC0315
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM,LIQUID WAS FC-75

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.769	46.198	13.345	18.730
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 12.87			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 171.74			
	AVERAGE TEMPERATURE: 56.244			
	SINK TEMPERATURE: 10.046			
2	2.760	49.792	12.367	17.358
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 14.35			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 177.45			
	AVERAGE TEMPERATURE: 59.838			
	SINK TEMPERATURE: 10.046			
3	2.754	47.550	12.907	18.115
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 13.42			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 173.17			
	AVERAGE TEMPERATURE: 57.596			
	SINK TEMPERATURE: 10.046			
4	2.780	44.626	13.855	19.447
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 12.25			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 169.68			
	AVERAGE TEMPERATURE: 54.672			
	SINK TEMPERATURE: 10.046			
5	2.841	49.097	12.909	18.118
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 14.06			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 181.45			
	AVERAGE TEMPERATURE: 59.143			
	SINK TEMPERATURE: 10.046			
6	2.824	47.801	13.168	18.482
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 13.52			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 178.02			
	AVERAGE TEMPERATURE: 57.847			
	SINK TEMPERATURE: 10.046			
7	2.740	43.728	13.931	19.553
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 11.90			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 165.74			
	AVERAGE TEMPERATURE: 53.774			
	SINK TEMPERATURE: 10.046			
8	2.837	47.208	13.387	18.790
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 13.28			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 177.74			
	AVERAGE TEMPERATURE: 57.254			
	SINK TEMPERATURE: 10.045			
9	2.838	46.896	13.478	18.917
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS: 13.15			
	FLUX BASED RAYLEIGH NUMBER * E-6 IS: 177.24			
	AVERAGE TEMPERATURE: 56.942			
	SINK TEMPERATURE: 10.046			

TABLE 36. REDUCED DATA FOR FC-43 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 12JAN1630
THE POWER SETTING PER CHIP WAS: 0.34 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.328	10.670	6.423	9.016
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.43
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.74
	AVERAGE TEMPERATURE: 20.575			
	SINK TEMPERATURE: 9.906			
2	.327	11.056	6.187	8.683
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.45
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.76
	AVERAGE TEMPERATURE: 20.962			
	SINK TEMPERATURE: 9.906			
3	.326	11.416	5.972	8.382
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.46
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.78
	AVERAGE TEMPERATURE: 21.322			
	SINK TEMPERATURE: 9.906			
4	.329	10.629	6.475	9.088
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.43
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.75
	AVERAGE TEMPERATURE: 20.535			
	SINK TEMPERATURE: 9.906			
5	.336	10.982	6.398	8.980
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.44
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.83
	AVERAGE TEMPERATURE: 20.888			
	SINK TEMPERATURE: 9.906			
6	.335	11.404	6.135	8.611
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.46
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.85
	AVERAGE TEMPERATURE: 21.310			
	SINK TEMPERATURE: 9.906			
7	.324	10.438	6.497	9.120
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.42
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.70
	AVERAGE TEMPERATURE: 20.343			
	SINK TEMPERATURE: 9.906			
8	.336	11.041	6.368	8.937
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.45
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.84
	AVERAGE TEMPERATURE: 20.946			
	SINK TEMPERATURE: 9.906			
9	.335	11.395	6.153	8.636
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.46
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.85
	AVERAGE TEMPERATURE: 21.300			
	SINK TEMPERATURE: 9.906			

TABLE 37. REDUCED DATA FOR FC-43 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 12JAN2045
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.770	17.633	9.128	12.812
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.54
	AVERAGE TEMPERATURE: 27.823			
	SINK TEMPERATURE: 10.190			
2	.768	17.888	8.981	12.605
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.84
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.57
	AVERAGE TEMPERATURE: 28.078			
	SINK TEMPERATURE: 10.190			
3	.766	18.134	8.831	12.395
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.58
	AVERAGE TEMPERATURE: 28.324			
	SINK TEMPERATURE: 10.190			
4	.773	17.555	9.211	12.929
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.82
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.57
	AVERAGE TEMPERATURE: 27.745			
	SINK TEMPERATURE: 10.190			
5	.790	17.946	9.201	12.914
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.79
	AVERAGE TEMPERATURE: 28.136			
	SINK TEMPERATURE: 10.190			
6	.786	18.448	8.911	12.507
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.83
	AVERAGE TEMPERATURE: 28.638			
	SINK TEMPERATURE: 10.190			
7	.762	17.617	9.049	12.701
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.47
	AVERAGE TEMPERATURE: 27.807			
	SINK TEMPERATURE: 10.190			
8	.789	18.063	9.141	12.830
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.81
	AVERAGE TEMPERATURE: 28.253			
	SINK TEMPERATURE: 10.190			
9	.787	18.282	8.999	12.630
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.81
	AVERAGE TEMPERATURE: 28.472			
	SINK TEMPERATURE: 10.190			

TABLE 38. REDUCED DATA FOR FC-43 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13JAN0045
THE POWER SETTING PER CHIP WAS: 1.3 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	ONET(W)	Tavg-Ts	Nu1	Nu2
1	1.244	24.192	10.760	15.102
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.28
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.77
	AVERAGE TEMPERATURE: 34.253			
	SINK TEMPERATURE: 10.061			
2	1.242	23.891	10.876	15.265
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.26
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.67
	AVERAGE TEMPERATURE: 33.951			
	SINK TEMPERATURE: 10.061			
3	1.237	23.690	10.926	15.336
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.24
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.56
	AVERAGE TEMPERATURE: 33.751			
	SINK TEMPERATURE: 10.061			
4	1.249	24.051	10.667	15.253
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.79
	AVERAGE TEMPERATURE: 34.112			
	SINK TEMPERATURE: 10.061			
5	1.276	24.048	11.101	15.580
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.08
	AVERAGE TEMPERATURE: 34.109			
	SINK TEMPERATURE: 10.061			
6	1.271	24.360	10.920	15.326
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.29
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.11
	AVERAGE TEMPERATURE: 34.421			
	SINK TEMPERATURE: 10.061			
7	1.234	24.114	10.704	15.024
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.63
	AVERAGE TEMPERATURE: 34.175			
	SINK TEMPERATURE: 10.061			
8	1.278	24.099	11.099	15.578
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.12
	AVERAGE TEMPERATURE: 34.160			
	SINK TEMPERATURE: 10.061			
9	1.276	23.930	11.154	15.656
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.26
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.05
	AVERAGE TEMPERATURE: 33.990			
	SINK TEMPERATURE: 10.061			

TABLE 39. REDUCED DATA FOR FC-43 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13JAN1S2S
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.647	29.363	11.744	16.483
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.71
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.07
	AVERAGE TEMPERATURE: 39.521			
	SINK TEMPERATURE: 10.158			
2	1.644	28.591	12.036	16.694
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.64
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			19.76
	AVERAGE TEMPERATURE: 38.749			
	SINK TEMPERATURE: 10.158			
3	1.637	28.463	12.040	16.899
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.63
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			19.64
	AVERAGE TEMPERATURE: 38.621			
	SINK TEMPERATURE: 10.158			
4	1.653	29.221	11.838	16.616
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.70
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.09
	AVERAGE TEMPERATURE: 39.379			
	SINK TEMPERATURE: 10.158			
5	1.689	29.288	12.070	16.941
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.70
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.55
	AVERAGE TEMPERATURE: 39.447			
	SINK TEMPERATURE: 10.158			
6	1.681	29.023	12.121	17.013
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.68
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.36
	AVERAGE TEMPERATURE: 39.182			
	SINK TEMPERATURE: 10.158			
7	1.629	29.298	11.638	16.335
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.70
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			19.82
	AVERAGE TEMPERATURE: 39.457			
	SINK TEMPERATURE: 10.158			
8	1.688	29.002	12.182	17.098
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.68
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.44
	AVERAGE TEMPERATURE: 39.161			
	SINK TEMPERATURE: 10.158			
9	1.682	28.653	12.290	17.249
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.65
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.24
	AVERAGE TEMPERATURE: 38.811			
	SINK TEMPERATURE: 10.158			

TABLE 40. REDUCED DATA FOR FC-43 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13JAN2020
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.171	35.295	12.879	18.077
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.22
	AVERAGE TEMPERATURE: 45.443			
	SINK TEMPERATURE: 10.148			
2	2.166	34.130	13.291	18.654
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.15
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			28.61
	AVERAGE TEMPERATURE: 44.278			
	SINK TEMPERATURE: 10.148			
3	2.158	33.840	13.353	18.742
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.12
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			28.36
	AVERAGE TEMPERATURE: 43.988			
	SINK TEMPERATURE: 10.148			
4	2.179	35.222	12.952	18.180
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.26
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.29
	AVERAGE TEMPERATURE: 45.371			
	SINK TEMPERATURE: 10.148			
5	2.227	34.581	13.483	18.925
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.20
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.62
	AVERAGE TEMPERATURE: 44.729			
	SINK TEMPERATURE: 10.148			
6	2.216	34.661	13.385	18.786
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.21
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.51
	AVERAGE TEMPERATURE: 44.809			
	SINK TEMPERATURE: 10.148			
7	2.149	35.275	12.756	17.904
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			28.91
	AVERAGE TEMPERATURE: 45.423			
	SINK TEMPERATURE: 10.148			
8	2.226	34.673	13.442	18.867
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.21
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.66
	AVERAGE TEMPERATURE: 44.822			
	SINK TEMPERATURE: 10.148			
9	2.220	34.389	13.516	18.970
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.18
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.44
	AVERAGE TEMPERATURE: 44.537			
	SINK TEMPERATURE: 10.148			

TABLE 41. REDUCED DATA FOR FC-43 AND 42 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 13JAN2400
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 42 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.776	41.936	13.866	19.462
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.98
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.34
	AVERAGE TEMPERATURE: 51.921			
	SINK TEMPERATURE: 9.985			
2	2.769	40.225	14.421	20.241
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.78
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			40.15
	AVERAGE TEMPERATURE: 50.210			
	SINK TEMPERATURE: 9.985			
3	2.759	39.794	14.521	20.382
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.74
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			39.72
	AVERAGE TEMPERATURE: 49.779			
	SINK TEMPERATURE: 9.985			
4	2.786	41.715	13.990	19.636
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.96
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.34
	AVERAGE TEMPERATURE: 51.700			
	SINK TEMPERATURE: 9.985			
5	2.846	40.234	14.818	20.799
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.78
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.27
	AVERAGE TEMPERATURE: 50.219			
	SINK TEMPERATURE: 9.985			
6	2.831	41.088	14.436	20.262
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.88
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.61
	AVERAGE TEMPERATURE: 51.073			
	SINK TEMPERATURE: 9.985			
7	2.747	41.657	13.815	19.390
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.95
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			40.73
	AVERAGE TEMPERATURE: 51.642			
	SINK TEMPERATURE: 9.985			
8	2.844	40.817	14.597	20.488
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.62
	AVERAGE TEMPERATURE: 50.802			
	SINK TEMPERATURE: 9.985			
9	2.836	40.465	14.682	20.607
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.81
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.27
	AVERAGE TEMPERATURE: 50.450			
	SINK TEMPERATURE: 9.985			

TABLE 42. REDUCED DATA FOR FC-43 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 16JAN0200
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.113	6.807	3.461	4.857
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.25
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.88
	AVERAGE TEMPERATURE: 17.001			
	SINK TEMPERATURE: 10.193			
2	.113	7.023	3.350	4.702
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.26
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.88
	AVERAGE TEMPERATURE: 17.217			
	SINK TEMPERATURE: 10.193			
3	.112	7.232	3.242	4.551
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.88
	AVERAGE TEMPERATURE: 17.425			
	SINK TEMPERATURE: 10.193			
4	.113	6.762	3.497	4.908
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.25
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.88
	AVERAGE TEMPERATURE: 16.955			
	SINK TEMPERATURE: 10.193			
5	.116	6.970	3.463	4.961
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.26
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.90
	AVERAGE TEMPERATURE: 17.163			
	SINK TEMPERATURE: 10.193			
6	.115	7.228	3.324	4.665
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.90
	AVERAGE TEMPERATURE: 17.421			
	SINK TEMPERATURE: 10.193			
7	.112	6.919	3.372	4.733
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.26
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.87
	AVERAGE TEMPERATURE: 17.112			
	SINK TEMPERATURE: 10.193			
8	.116	7.104	3.404	4.777
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.91
	AVERAGE TEMPERATURE: 17.297			
	SINK TEMPERATURE: 10.193			
9	.115	7.299	3.303	4.635
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.91
	AVERAGE TEMPERATURE: 17.492			
	SINK TEMPERATURE: 10.193			

TABLE 43. REDUCED DATA FOR FC-43 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 14JAN1800
THE POWER SETTING PER CHIP WAS: 0.34 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.328	11.446	5.996	8.416
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.47
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.79
	AVERAGE TEMPERATURE: 21.331			
	SINK TEMPERATURE: 9.885			
2	.328	11.812	5.797	8.137
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.81
	AVERAGE TEMPERATURE: 21.698			
	SINK TEMPERATURE: 9.885			
3	.326	12.181	5.601	7.861
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.50
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.82
	AVERAGE TEMPERATURE: 22.066			
	SINK TEMPERATURE: 9.885			
4	.330	11.421	6.037	8.474
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.46
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.80
	AVERAGE TEMPERATURE: 21.306			
	SINK TEMPERATURE: 9.885			
5	.337	11.798	5.973	8.383
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	AVERAGE TEMPERATURE: 21.684			
	SINK TEMPERATURE: 9.885			
6	.336	12.231	5.735	8.050
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.51
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.90
	AVERAGE TEMPERATURE: 22.117			
	SINK TEMPERATURE: 9.885			
7	.326	11.604	5.866	8.234
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.47
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.78
	AVERAGE TEMPERATURE: 21.489			
	SINK TEMPERATURE: 9.885			
8	.337	11.864	5.946	8.346
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.49
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.90
	AVERAGE TEMPERATURE: 21.749			
	SINK TEMPERATURE: 9.885			
9	.336	12.175	5.773	8.103
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.50
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.91
	AVERAGE TEMPERATURE: 22.061			
	SINK TEMPERATURE: 9.885			

TABLE 44. REDUCED DATA FOR FC-43 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 14JAN2300
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavo-Ts	Nu1	Nu2
1	.771	18.747	8.601	12.072
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.65
	AVERAGE TEMPERATURE: 28.685			
	SINK TEMPERATURE: 9.941			
2	.769	18.856	8.532	11.976
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.65
	AVERAGE TEMPERATURE: 28.797			
	SINK TEMPERATURE: 9.941			
3	.766	19.041	8.411	11.806
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.91
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.64
	AVERAGE TEMPERATURE: 28.982			
	SINK TEMPERATURE: 9.941			
4	.773	18.583	8.702	12.214
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.88
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.65
	AVERAGE TEMPERATURE: 28.524			
	SINK TEMPERATURE: 9.941			
5	.790	18.922	8.730	12.253
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.90
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.87
	AVERAGE TEMPERATURE: 28.863			
	SINK TEMPERATURE: 9.941			
6	.786	19.351	8.492	11.919
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.93
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.89
	AVERAGE TEMPERATURE: 29.293			
	SINK TEMPERATURE: 9.941			
7	.762	18.823	8.458	11.885
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.57
	AVERAGE TEMPERATURE: 28.764			
	SINK TEMPERATURE: 9.941			
8	.790	19.003	8.696	12.205
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.91
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.88
	AVERAGE TEMPERATURE: 28.944			
	SINK TEMPERATURE: 9.941			
9	.787	19.211	8.572	12.032
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.92
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.89
	AVERAGE TEMPERATURE: 29.152			
	SINK TEMPERATURE: 9.941			

TABLE 45. REDUCED DATA FOR FC-43 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 15JAN0140
THE POWER SETTING PER CHIP WAS: 1.3 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.240	25.912	10.013	14.053
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.06
	AVERAGE TEMPERATURE: 35.775			
	SINK TEMPERATURE: 9.863			
2	1.236	25.479	10.153	14.251
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.37
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.91
	AVERAGE TEMPERATURE: 35.342			
	SINK TEMPERATURE: 9.863			
3	1.231	25.593	10.057	14.130
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.38
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.88
	AVERAGE TEMPERATURE: 35.456			
	SINK TEMPERATURE: 9.863			
4	1.242	25.757	10.093	14.166
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.39
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.05
	AVERAGE TEMPERATURE: 35.620			
	SINK TEMPERATURE: 9.863			
5	1.269	25.748	10.315	14.478
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.39
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.35
	AVERAGE TEMPERATURE: 35.611			
	SINK TEMPERATURE: 9.863			
6	1.263	25.847	10.226	14.353
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.30
	AVERAGE TEMPERATURE: 35.710			
	SINK TEMPERATURE: 9.863			
7	1.224	26.064	9.826	13.792
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.42
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			13.92
	AVERAGE TEMPERATURE: 35.927			
	SINK TEMPERATURE: 9.863			
8	1.268	25.847	10.268	14.412
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.36
	AVERAGE TEMPERATURE: 35.710			
	SINK TEMPERATURE: 9.863			
9	1.265	25.777	10.267	14.410
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.39
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.30
	AVERAGE TEMPERATURE: 35.639			
	SINK TEMPERATURE: 9.863			

TABLE 46. REDUCED DATA FOR FC-43 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 15JAN1610
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.643	31.237	11.013	15.458
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.64
	AVERAGE TEMPERATURE: 41.347			
	SINK TEMPERATURE: 10.111			
2	1.640	30.352	11.313	15.879
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.79
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.30
	AVERAGE TEMPERATURE: 40.462			
	SINK TEMPERATURE: 10.111			
3	1.634	30.346	11.274	15.824
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.79
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.22
	AVERAGE TEMPERATURE: 40.457			
	SINK TEMPERATURE: 10.111			
4	1.650	31.030	11.134	15.627
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.66
	AVERAGE TEMPERATURE: 41.141			
	SINK TEMPERATURE: 10.111			
5	1.687	30.786	11.469	16.097
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.03
	AVERAGE TEMPERATURE: 40.897			
	SINK TEMPERATURE: 10.111			
6	1.679	30.558	11.498	16.139
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.81
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.84
	AVERAGE TEMPERATURE: 40.668			
	SINK TEMPERATURE: 10.111			
7	1.628	31.065	10.968	15.395
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.39
	AVERAGE TEMPERATURE: 41.175			
	SINK TEMPERATURE: 10.111			
8	1.687	30.788	11.467	16.095
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.02
	AVERAGE TEMPERATURE: 40.898			
	SINK TEMPERATURE: 10.111			
9	1.662	30.617	11.501	16.142
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.82
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			20.91
	AVERAGE TEMPERATURE: 40.727			
	SINK TEMPERATURE: 10.111			

TABLE 47. REDUCED DATA FOR FC-43 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 15JAN1850
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.165	37.634	12.048	16.910
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.50
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			30.10
	AVERAGE TEMPERATURE: 47.604			
	SINK TEMPERATURE: 9.970			
2	2.160	36.317	12.458	17.485
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.36
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.40
	AVERAGE TEMPERATURE: 46.287			
	SINK TEMPERATURE: 9.970			
3	2.153	36.345	12.404	17.410
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.36
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.31
	AVERAGE TEMPERATURE: 46.315			
	SINK TEMPERATURE: 9.970			
4	2.174	37.491	12.144	17.045
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			30.15
	AVERAGE TEMPERATURE: 47.461			
	SINK TEMPERATURE: 9.970			
5	2.221	38.748	12.655	17.763
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			30.43
	AVERAGE TEMPERATURE: 48.717			
	SINK TEMPERATURE: 9.970			
6	2.209	36.634	12.627	17.723
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.39
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			30.21
	AVERAGE TEMPERATURE: 46.604			
	SINK TEMPERATURE: 9.970			
7	2.142	37.333	12.016	16.865
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.47
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			29.63
	AVERAGE TEMPERATURE: 47.302			
	SINK TEMPERATURE: 9.970			
8	2.218	36.983	12.561	17.631
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.43
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			30.51
	AVERAGE TEMPERATURE: 46.952			
	SINK TEMPERATURE: 9.970			
9	2.211	36.723	12.611	17.700
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			30.29
	AVERAGE TEMPERATURE: 46.693			
	SINK TEMPERATURE: 9.970			

TABLE 48. REDUCED DATA FOR FC-43 AND 30 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 15JAN2300
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 30 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.770	43.939	13.208	18.539
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.23
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			42.63
	AVERAGE TEMPERATURE: 53.973			
	SINK TEMPERATURE: 10.034			
2	2.763	42.359	13.668	19.165
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.04
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.49
	AVERAGE TEMPERATURE: 52.393			
	SINK TEMPERATURE: 10.034			
3	2.753	42.274	13.646	19.154
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.03
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			41.29
	AVERAGE TEMPERATURE: 52.307			
	SINK TEMPERATURE: 10.034			
4	2.781	43.700	13.334	18.715
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.20
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			42.64
	AVERAGE TEMPERATURE: 53.733			
	SINK TEMPERATURE: 10.034			
5	2.841	42.746	13.927	19.548
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.08
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			42.93
	AVERAGE TEMPERATURE: 52.780			
	SINK TEMPERATURE: 10.034			
6	2.828	42.465	13.951	19.581
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			42.53
	AVERAGE TEMPERATURE: 52.499			
	SINK TEMPERATURE: 10.034			
7	2.743	43.800	13.124	18.421
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.21
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			42.13
	AVERAGE TEMPERATURE: 53.833			
	SINK TEMPERATURE: 10.034			
8	2.841	42.987	13.846	19.433
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.11
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			43.07
	AVERAGE TEMPERATURE: 53.021			
	SINK TEMPERATURE: 10.034			
9	2.832	42.886	13.635	19.419
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			42.88
	AVERAGE TEMPERATURE: 52.922			
	SINK TEMPERATURE: 10.034			

TABLE 49. REDUCED DATA FOR FC-43 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 17JAN1350
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2	
1	.113	7.632	3.086	4.331	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.29
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.88
	AVERAGE TEMPERATURE: 17.551				
	SINK TEMPERATURE: 9.919				
2	.113	7.814	3.010	4.225	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.29
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.88
	AVERAGE TEMPERATURE: 17.733				
	SINK TEMPERATURE: 9.919				
3	.112	7.927	2.956	4.149	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.30
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.88
	AVERAGE TEMPERATURE: 17.846				
	SINK TEMPERATURE: 9.919				
4	.113	7.558	3.131	4.395	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.28
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.89
	AVERAGE TEMPERATURE: 17.477				
	SINK TEMPERATURE: 9.919				
5	.116	7.757	3.116	4.374	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.29
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.91
	AVERAGE TEMPERATURE: 17.676				
	SINK TEMPERATURE: 9.919				
6	.115	7.902	3.046	4.276	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.30
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.91
	AVERAGE TEMPERATURE: 17.822				
	SINK TEMPERATURE: 9.919				
7	.112	7.151	3.253	4.580	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.86
	AVERAGE TEMPERATURE: 17.071				
	SINK TEMPERATURE: 9.919				
8	.116	7.932	3.045	4.274	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.30
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.91
	AVERAGE TEMPERATURE: 17.851				
	SINK TEMPERATURE: 9.919				
9	.115	7.997	3.010	4.225	
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:				.30
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:				.91
	AVERAGE TEMPERATURE: 17.917				
	SINK TEMPERATURE: 9.919				

TABLE 50. REDUCED DATA FOR FC-43 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 17JAN1750
THE POWER SETTING PER CHIP WAS: 0.34 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.328	12.694	5.403	7.584
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.53
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.88
	AVERAGE TEMPERATURE: 22.700			
	SINK TEMPERATURE: 10.006			
2	.327	13.005	5.261	7.385
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.55
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	AVERAGE TEMPERATURE: 23.012			
	SINK TEMPERATURE: 10.006			
3	.326	13.359	5.105	7.166
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.57
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.91
	AVERAGE TEMPERATURE: 23.366			
	SINK TEMPERATURE: 10.006			
4	.330	12.616	5.463	7.667
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.53
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	AVERAGE TEMPERATURE: 22.623			
	SINK TEMPERATURE: 10.005			
5	.337	12.965	5.418	7.605
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.55
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.57
	AVERAGE TEMPERATURE: 22.992			
	SINK TEMPERATURE: 10.006			
6	.335	13.401	5.225	7.334
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.57
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.99
	AVERAGE TEMPERATURE: 23.408			
	SINK TEMPERATURE: 10.006			
7	.325	12.613	5.383	7.556
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.53
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.85
	AVERAGE TEMPERATURE: 22.619			
	SINK TEMPERATURE: 10.006			
8	.336	13.033	5.396	7.574
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.55
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.98
	AVERAGE TEMPERATURE: 23.040			
	SINK TEMPERATURE: 10.006			
9	.335	13.245	5.292	7.428
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.56
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.98
	AVERAGE TEMPERATURE: 23.251			
	SINK TEMPERATURE: 10.006			

TABLE 51. REDUCED DATA FOR FC-43 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 17JAN2225
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.764	21.354	7.488	10.510
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.96
	AVERAGE TEMPERATURE: 31.226			
	SINK TEMPERATURE: 9.872			
2	.763	21.375	7.462	10.474
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.95
	AVERAGE TEMPERATURE: 31.248			
	SINK TEMPERATURE: 9.872			
3	.760	21.551	7.376	10.353
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.94
	AVERAGE TEMPERATURE: 31.423			
	SINK TEMPERATURE: 9.872			
4	.767	21.230	7.553	10.609
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.97
	AVERAGE TEMPERATURE: 31.102			
	SINK TEMPERATURE: 9.872			
5	.783	21.420	7.645	10.730
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.07
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.16
	AVERAGE TEMPERATURE: 31.292			
	SINK TEMPERATURE: 9.872			
6	.779	21.670	7.518	10.552
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.16
	AVERAGE TEMPERATURE: 31.542			
	SINK TEMPERATURE: 9.872			
7	.755	21.211	7.444	10.448
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.84
	AVERAGE TEMPERATURE: 31.083			
	SINK TEMPERATURE: 9.872			
8	.782	21.555	7.586	10.647
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.08
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.18
	AVERAGE TEMPERATURE: 31.437			
	SINK TEMPERATURE: 9.872			
9	.779	21.723	7.506	10.535
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.17
	AVERAGE TEMPERATURE: 31.595			
	SINK TEMPERATURE: 9.873			

TABLE 52. REDUCED DATA FOR FC-43 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 18DEC0205
THE POWER SETTING PER CHIP WAS: 1.34 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.238	28.569	9.062	12.719
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.63
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.77
	AVERAGE TEMPERATURE: 38.536			
	SINK TEMPERATURE: 9.949			
2	1.234	28.360	9.108	12.764
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.61
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.67
	AVERAGE TEMPERATURE: 38.308			
	SINK TEMPERATURE: 9.949			
3	1.230	28.522	9.023	12.665
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.62
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.65
	AVERAGE TEMPERATURE: 38.471			
	SINK TEMPERATURE: 9.949			
4	1.242	28.510	9.117	12.796
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.62
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.80
	AVERAGE TEMPERATURE: 38.456			
	SINK TEMPERATURE: 9.949			
5	1.269	28.524	9.309	13.066
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.67
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.12
	AVERAGE TEMPERATURE: 38.472			
	SINK TEMPERATURE: 9.949			
6	1.263	28.620	9.236	12.964
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.63
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.08
	AVERAGE TEMPERATURE: 38.568			
	SINK TEMPERATURE: 9.949			
7	1.225	28.662	8.949	12.560
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.64
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			14.64
	AVERAGE TEMPERATURE: 38.610			
	SINK TEMPERATURE: 9.949			
8	1.270	28.618	9.265	13.032
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.63
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.16
	AVERAGE TEMPERATURE: 38.567			
	SINK TEMPERATURE: 9.949			
9	1.266	28.494	9.298	13.051
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.67
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.08
	AVERAGE TEMPERATURE: 38.443			
	SINK TEMPERATURE: 9.949			

TABLE 53. REDUCED DATA FOR FC-43 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 18JAN1800
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.646	34.024	10.131	14.219
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.13
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.83
	AVERAGE TEMPERATURE: 43.942			
	SINK TEMPERATURE: 9.919			
2	1.642	33.375	10.303	14.461
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.25
	AVERAGE TEMPERATURE: 43.293			
	SINK TEMPERATURE: 9.919			
3	1.636	33.379	10.260	14.401
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.17
	AVERAGE TEMPERATURE: 43.297			
	SINK TEMPERATURE: 9.919			
4	1.652	33.926	10.187	14.312
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.12
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.58
	AVERAGE TEMPERATURE: 43.845			
	SINK TEMPERATURE: 9.919			
5	1.688	33.709	10.434	14.715
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.95
	AVERAGE TEMPERATURE: 43.628			
	SINK TEMPERATURE: 9.919			
6	1.679	33.678	10.376	14.563
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.11
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.91
	AVERAGE TEMPERATURE: 43.797			
	SINK TEMPERATURE: 9.919			
7	1.628	33.691	10.117	14.200
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.18
	AVERAGE TEMPERATURE: 43.610			
	SINK TEMPERATURE: 9.919			
8	1.687	33.729	10.473	14.700
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.96
	AVERAGE TEMPERATURE: 43.648			
	SINK TEMPERATURE: 9.919			
9	1.683	33.645	10.473	14.699
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.88
	AVERAGE TEMPERATURE: 43.563			
	SINK TEMPERATURE: 9.919			

TABLE 54. REDUCED DATA FOR FC-43 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 18JAN2240
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.163	40.821	11.072	15.541
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			31.70
	AVERAGE TEMPERATURE: 50.906			
	SINK TEMPERATURE: 9.985			
2	2.158	40.589	11.136	15.630
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			31.46
	AVERAGE TEMPERATURE: 50.574			
	SINK TEMPERATURE: 9.985			
3	2.149	40.875	11.014	15.459
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			31.48
	AVERAGE TEMPERATURE: 50.860			
	SINK TEMPERATURE: 9.985			
4	2.171	40.771	11.153	15.654
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			31.74
	AVERAGE TEMPERATURE: 50.756			
	SINK TEMPERATURE: 9.985			
5	2.217	40.881	11.363	15.948
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.86
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			32.48
	AVERAGE TEMPERATURE: 50.856			
	SINK TEMPERATURE: 9.985			
6	2.205	41.163	11.223	15.752
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			32.45
	AVERAGE TEMPERATURE: 51.148			
	SINK TEMPERATURE: 9.985			
7	2.139	40.668	11.019	15.466
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.83
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			31.23
	AVERAGE TEMPERATURE: 50.653			
	SINK TEMPERATURE: 9.985			
8	2.216	40.960	11.335	15.909
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.87
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			32.50
	AVERAGE TEMPERATURE: 50.946			
	SINK TEMPERATURE: 9.985			
9	2.209	41.152	11.247	15.786
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			32.50
	AVERAGE TEMPERATURE: 51.137			
	SINK TEMPERATURE: 9.985			

TABLE 55. REDUCED DATA FOR FC-43 AND 18 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 21JAN0315
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 18 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.745	47.753	12.046	16.908
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.69
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			44.45
	AVERAGE TEMPERATURE: 57.529			
	SINK TEMPERATURE: 9.766			
2	2.739	47.423	12.103	16.988
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.64
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			44.11
	AVERAGE TEMPERATURE: 57.189			
	SINK TEMPERATURE: 9.766			
3	2.728	48.073	11.894	16.694
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.73
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			44.38
	AVERAGE TEMPERATURE: 57.839			
	SINK TEMPERATURE: 9.766			
4	2.756	47.612	12.131	17.026
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.67
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			44.52
	AVERAGE TEMPERATURE: 57.378			
	SINK TEMPERATURE: 9.766			
5	2.816	47.960	12.304	17.270
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.72
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			45.73
	AVERAGE TEMPERATURE: 57.726			
	SINK TEMPERATURE: 9.766			
6	2.801	48.041	12.218	17.149
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.73
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			45.54
	AVERAGE TEMPERATURE: 57.807			
	SINK TEMPERATURE: 9.766			
7	2.716	47.165	12.069	16.940
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.61
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			43.58
	AVERAGE TEMPERATURE: 56.931			
	SINK TEMPERATURE: 9.766			
8	2.813	48.010	12.281	17.239
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.72
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			45.72
	AVERAGE TEMPERATURE: 57.775			
	SINK TEMPERATURE: 9.766			
9	2.806	48.231	12.194	17.115
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.75
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			45.76
	AVERAGE TEMPERATURE: 57.998			
	SINK TEMPERATURE: 9.766			

TABLE 56. REDUCED DATA FOR FC-43 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 22JAN1920
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.113	8.362	2.823	3.963
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.90
	AVERAGE TEMPERATURE: 18.330			
	SINK TEMPERATURE: 9.968			
2	.113	8.542	2.756	3.869
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.33
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.90
	AVERAGE TEMPERATURE: 18.510			
	SINK TEMPERATURE: 9.968			
3	.112	8.355	2.809	3.942
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.90
	AVERAGE TEMPERATURE: 18.323			
	SINK TEMPERATURE: 9.968			
4	.113	8.265	2.861	4.016
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.90
	AVERAGE TEMPERATURE: 18.253			
	SINK TEMPERATURE: 9.968			
5	.116	8.445	2.663	4.018
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.92
	AVERAGE TEMPERATURE: 18.413			
	SINK TEMPERATURE: 9.968			
6	.115	8.648	2.784	3.907
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.33
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.92
	AVERAGE TEMPERATURE: 18.615			
	SINK TEMPERATURE: 9.968			
7	.112	8.202	2.848	3.998
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.31
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.89
	AVERAGE TEMPERATURE: 18.170			
	SINK TEMPERATURE: 9.968			
8	.116	8.619	2.811	3.946
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.33
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.93
	AVERAGE TEMPERATURE: 18.587			
	SINK TEMPERATURE: 9.968			
9	.116	8.439	2.865	4.022
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.92
	AVERAGE TEMPERATURE: 18.407			
	SINK TEMPERATURE: 9.968			

TABLE 57. REDUCED DATA FOR FC-43 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 22JAN2305
THE POWER SETTING PER CHIP WAS: 0.34 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.324	13.552	5.004	7.024
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.58
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.88
	AVERAGE TEMPERATURE: 23.400			
	SINK TEMPERATURE: 9.848			
2	.324	13.779	4.909	6.880
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.59
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.83
	AVERAGE TEMPERATURE: 23.627			
	SINK TEMPERATURE: 9.848			
3	.322	14.227	4.735	6.645
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.61
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.90
	AVERAGE TEMPERATURE: 24.074			
	SINK TEMPERATURE: 9.848			
4	.325	13.599	5.002	7.020
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.58
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.89
	AVERAGE TEMPERATURE: 23.447			
	SINK TEMPERATURE: 9.848			
5	.332	13.899	4.996	7.013
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.87
	AVERAGE TEMPERATURE: 23.747			
	SINK TEMPERATURE: 9.848			
6	.330	14.285	4.837	6.789
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.62
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.98
	AVERAGE TEMPERATURE: 24.133			
	SINK TEMPERATURE: 9.848			
7	.320	13.331	5.021	7.048
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.56
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.83
	AVERAGE TEMPERATURE: 23.179			
	SINK TEMPERATURE: 9.848			
8	.332	13.920	4.987	7.000
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.97
	AVERAGE TEMPERATURE: 23.768			
	SINK TEMPERATURE: 9.848			
9	.331	14.248	4.857	6.817
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.61
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.98
	AVERAGE TEMPERATURE: 24.096			
	SINK TEMPERATURE: 9.848			

TABLE 58. REDUCED DATA FOR FC-43 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 23JAN0200
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.764	21.786	7.328	10.285
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			6.08
	AVERAGE TEMPERATURE: 31.854			
	SINK TEMPERATURE: 10.058			
2	.762	22.507	7.060	9.938
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.15
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.17
	AVERAGE TEMPERATURE: 32.565			
	SINK TEMPERATURE: 10.058			
3	.758	22.988	6.900	9.664
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.19
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.20
	AVERAGE TEMPERATURE: 33.048			
	SINK TEMPERATURE: 10.058			
4	.765	21.789	7.344	10.307
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.09
	AVERAGE TEMPERATURE: 31.846			
	SINK TEMPERATURE: 10.058			
5	.781	22.300	7.328	10.286
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.14
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.34
	AVERAGE TEMPERATURE: 32.359			
	SINK TEMPERATURE: 10.058			
6	.777	23.021	7.065	9.916
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.19
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.42
	AVERAGE TEMPERATURE: 33.079			
	SINK TEMPERATURE: 10.058			
7	.754	21.664	7.277	10.214
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			7.95
	AVERAGE TEMPERATURE: 31.722			
	SINK TEMPERATURE: 10.058			
8	.782	22.264	7.346	10.311
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.14
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.34
	AVERAGE TEMPERATURE: 32.323			
	SINK TEMPERATURE: 10.058			
9	.780	22.547	7.235	10.155
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.16
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.37
	AVERAGE TEMPERATURE: 32.605			
	SINK TEMPERATURE: 10.058			

TABLE 59. REDUCED DATA FOR FC-43 AND 11 MM SPACING

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 THE RAW Emf DATA ARE FROM THE FILE:     23JAN1990
 THE POWER SETTING PER CHIP WAS:    1.3 W
 THE DISTANCE TO THE FRONT WALL WAS 11 MM
 ELECTRONIC LIQUID WAS FC-43

CHIP    QNET(W)  Tavg-Ts       Nu1         Nu2

 1       1.260    31.053      8.493     11.920
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.84
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    15.63
   AVERAGE TEMPERATURE: 40.886
   SINK TEMPERATURE:  9.833

 2       1.256    31.815      8.267     11.603
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.91
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    15.79
   AVERAGE TEMPERATURE: 41.648
   SINK TEMPERATURE:  9.833

 3       1.252    32.353      8.100     11.369
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.98
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    15.88
   AVERAGE TEMPERATURE: 42.185
   SINK TEMPERATURE:  9.833

 4       1.264    30.882      9.569     12.027
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.82
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    15.63
   AVERAGE TEMPERATURE: 40.715
   SINK TEMPERATURE:  9.833

 5       1.291    31.827      8.490     11.917
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.91
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    16.22
   AVERAGE TEMPERATURE: 41.660
   SINK TEMPERATURE:  9.833

 6       1.284    32.279      8.331     11.693
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.95
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    16.27
   AVERAGE TEMPERATURE: 42.111
   SINK TEMPERATURE:  9.833

 7       1.246    31.014      8.410     11.804
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.84
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    15.44
   AVERAGE TEMPERATURE: 40.847
   SINK TEMPERATURE:  9.833

 8       1.291    31.958      8.458     11.871
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.92
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    16.26
   AVERAGE TEMPERATURE: 41.791
   SINK TEMPERATURE:  9.833

 9       1.288    32.348      8.332     11.695
   TEMP.BASED RAYLEIGH NUMBER * E-6 IS:     1.96
   FLUX BASED RAYLEIGH NUMBER * E-6 IS:    16.23
   AVERAGE TEMPERATURE: 42.181
   SINK TEMPERATURE:  9.833
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TABLE 60. REDUCED DATA FOR FC-43 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 23JAN2345
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.639	35.662	9.568	13.429
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.31
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			22.15
	AVERAGE TEMPERATURE: 45.845			
	SINK TEMPERATURE: 9.964			
2	1.635	37.456	9.144	12.834
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			22.66
	AVERAGE TEMPERATURE: 47.420			
	SINK TEMPERATURE: 9.964			
3	1.629	37.956	8.981	12.606
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.54
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			22.77
	AVERAGE TEMPERATURE: 47.950			
	SINK TEMPERATURE: 9.964			
4	1.646	35.742	9.644	13.536
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.30
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			22.15
	AVERAGE TEMPERATURE: 45.706			
	SINK TEMPERATURE: 9.964			
5	1.662	37.473	9.398	13.192
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.48
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			23.31
	AVERAGE TEMPERATURE: 47.437			
	SINK TEMPERATURE: 9.964			
6	1.674	37.527	9.342	13.112
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.49
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			23.22
	AVERAGE TEMPERATURE: 47.490			
	SINK TEMPERATURE: 9.964			
7	1.624	35.619	9.546	13.398
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.29
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			21.84
	AVERAGE TEMPERATURE: 45.582			
	SINK TEMPERATURE: 9.964			
8	1.681	37.741	9.331	13.097
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.51
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			23.41
	AVERAGE TEMPERATURE: 47.704			
	SINK TEMPERATURE: 9.964			
9	1.677	37.801	9.292	13.042
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.52
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			23.37
	AVERAGE TEMPERATURE: 47.764			
	SINK TEMPERATURE: 9.964			

TABLE 61. REDUCED DATA FOR FC-43 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 24JAN1440
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.157	43.058	10.495	14.731
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.10
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			32.50
	AVERAGE TEMPERATURE: 52.856			
	SINK TEMPERATURE: 9.798			
2	2.151	45.046	10.007	14.046
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.34
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.44
	AVERAGE TEMPERATURE: 54.844			
	SINK TEMPERATURE: 9.798			
3	2.143	45.426	9.884	13.873
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.39
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.50
	AVERAGE TEMPERATURE: 55.224			
	SINK TEMPERATURE: 9.798			
4	2.165	43.017	10.545	14.801
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.09
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			32.60
	AVERAGE TEMPERATURE: 52.815			
	SINK TEMPERATURE: 9.798			
5	2.211	44.908	10.319	14.483
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.30
	AVERAGE TEMPERATURE: 54.705			
	SINK TEMPERATURE: 9.798			
6	2.200	45.337	10.169	14.273
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.38
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.35
	AVERAGE TEMPERATURE: 55.135			
	SINK TEMPERATURE: 9.798			
7	2.136	42.780	10.459	14.679
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.06
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			32.04
	AVERAGE TEMPERATURE: 52.577			
	SINK TEMPERATURE: 9.798			
8	2.211	45.681	10.144	14.237
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.42
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.71
	AVERAGE TEMPERATURE: 55.479			
	SINK TEMPERATURE: 9.798			
9	2.205	45.251	10.189	14.302
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.38
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.44
	AVERAGE TEMPERATURE: 55.149			
	SINK TEMPERATURE: 9.798			

TABLE 62. REDUCED DATA FOR FC-43 AND 11 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 24JAN2245
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 11 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.757	49.450	11.687	16.404
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.97
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			46.35
	AVERAGE TEMPERATURE: 59.602			
	SINK TEMPERATURE: 10.153			
2	2.751	52.109	11.067	15.534
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.35
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			48.16
	AVERAGE TEMPERATURE: 62.261			
	SINK TEMPERATURE: 10.153			
3	2.741	52.056	11.038	15.493
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.34
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			47.95
	AVERAGE TEMPERATURE: 62.209			
	SINK TEMPERATURE: 10.153			
4	2.769	49.432	11.740	16.476
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.96
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			46.54
	AVERAGE TEMPERATURE: 59.585			
	SINK TEMPERATURE: 10.153			
5	2.627	51.951	11.401	16.003
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.33
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			49.42
	AVERAGE TEMPERATURE: 62.144			
	SINK TEMPERATURE: 10.153			
6	2.813	52.093	11.320	15.888
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.35
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			49.24
	AVERAGE TEMPERATURE: 62.246			
	SINK TEMPERATURE: 10.153			
7	2.729	48.886	11.700	16.422
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.89
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			45.48
	AVERAGE TEMPERATURE: 59.036			
	SINK TEMPERATURE: 10.153			
8	2.825	53.017	11.173	15.682
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.49
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			50.16
	AVERAGE TEMPERATURE: 63.170			
	SINK TEMPERATURE: 10.153			
9	2.817	51.900	11.350	15.973
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			49.17
	AVERAGE TEMPERATURE: 62.053			
	SINK TEMPERATURE: 10.153			

TABLE 63. REDUCED DATA FOR FC-43 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 3FEB1535
THE POWER SETTING PER CHIP WAS: 0.115 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.112	10.119	2.313	3.247
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.93
	AVERAGE TEMPERATURE: 20.046			
	SINK TEMPERATURE: 9.927			
2	.112	10.466	2.234	3.135
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.42
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.93
	AVERAGE TEMPERATURE: 20.393			
	SINK TEMPERATURE: 9.927			
3	.111	10.055	2.313	3.247
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.92
	AVERAGE TEMPERATURE: 19.982			
	SINK TEMPERATURE: 9.927			
4	.112	10.176	2.306	3.237
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.93
	AVERAGE TEMPERATURE: 20.103			
	SINK TEMPERATURE: 9.927			
5	.115	10.463	2.290	3.214
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.42
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.96
	AVERAGE TEMPERATURE: 20.390			
	SINK TEMPERATURE: 9.927			
6	.114	10.133	2.351	3.300
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.94
	AVERAGE TEMPERATURE: 20.060			
	SINK TEMPERATURE: 9.927			
7	.110	10.185	2.262	3.175
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.91
	AVERAGE TEMPERATURE: 20.111			
	SINK TEMPERATURE: 9.927			
8	.114	10.377	2.295	3.222
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.41
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.95
	AVERAGE TEMPERATURE: 20.303			
	SINK TEMPERATURE: 9.927			
9	.113	10.128	2.340	3.284
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			.94
	AVERAGE TEMPERATURE: 20.055			
	SINK TEMPERATURE: 9.927			

TABLE 64. REDUCED DATA FOR FC-43 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 3FEB2045
THE POWER SETTING PER CHIP WAS: 0.34 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.322	14.745	4.572	6.417
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.65
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.97
	AVERAGE TEMPERATURE: 24.836			
	SINK TEMPERATURE: 10.091			
2	.322	15.192	4.429	6.217
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.68
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.99
	AVERAGE TEMPERATURE: 25.283			
	SINK TEMPERATURE: 10.091			
3	.321	14.609	4.587	6.439
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.64
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.94
	AVERAGE TEMPERATURE: 24.700			
	SINK TEMPERATURE: 10.091			
4	.324	14.454	4.681	6.570
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.63
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.96
	AVERAGE TEMPERATURE: 24.545			
	SINK TEMPERATURE: 10.091			
5	.330	15.059	4.585	6.435
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.67
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			3.06
	AVERAGE TEMPERATURE: 25.150			
	SINK TEMPERATURE: 10.091			
6	.329	15.016	4.575	6.422
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.66
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			3.04
	AVERAGE TEMPERATURE: 25.107			
	SINK TEMPERATURE: 10.091			
7	.318	14.254	4.668	6.552
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.62
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			2.90
	AVERAGE TEMPERATURE: 24.345			
	SINK TEMPERATURE: 10.091			
8	.330	14.900	4.627	6.495
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.66
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			3.05
	AVERAGE TEMPERATURE: 24.991			
	SINK TEMPERATURE: 10.091			
9	.328	14.717	4.665	6.548
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			.65
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			3.02
	AVERAGE TEMPERATURE: 24.809			
	SINK TEMPERATURE: 10.091			

TABLE 65. REDUCED DATA FOR FC-43 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 4FEB0120
THE POWER SETTING PER CHIP WAS: 0.8 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	.761	24.612	6.470	9.082
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.31
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.51
	AVERAGE TEMPERATURE: 34.736			
	SINK TEMPERATURE: 10.124			
2	.760	25.706	6.184	8.679
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.40
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.86
	AVERAGE TEMPERATURE: 35.832			
	SINK TEMPERATURE: 10.124			
3	.757	24.426	6.486	9.107
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.30
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.44
	AVERAGE TEMPERATURE: 34.549			
	SINK TEMPERATURE: 10.124			
4	.765	23.998	6.669	9.361
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.27
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.45
	AVERAGE TEMPERATURE: 34.109			
	SINK TEMPERATURE: 10.124			
5	.780	25.051	6.518	9.149
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.35
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.79
	AVERAGE TEMPERATURE: 35.174			
	SINK TEMPERATURE: 10.124			
6	.776	24.679	6.581	9.237
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.69
	AVERAGE TEMPERATURE: 34.803			
	SINK TEMPERATURE: 10.124			
7	.753	23.626	6.664	9.354
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.24
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.26
	AVERAGE TEMPERATURE: 33.749			
	SINK TEMPERATURE: 10.124			
8	.780	24.718	6.603	9.267
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.74
	AVERAGE TEMPERATURE: 34.841			
	SINK TEMPERATURE: 10.124			
9	.778	24.726	6.582	9.238
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			8.71
	AVERAGE TEMPERATURE: 34.849			
	SINK TEMPERATURE: 10.124			

TABLE 66. REDUCED DATA FOR FC-43 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 4FEB1730
THE POWER SETTING PER CHIP WAS: 1.2 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.229	32.259	7.975	11.193
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.96
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.61
	AVERAGE TEMPERATURE: 42.178			
	SINK TEMPERATURE: 9.919			
2	1.225	34.086	7.525	10.562
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.13
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			16.04
	AVERAGE TEMPERATURE: 44.005			
	SINK TEMPERATURE: 9.919			
3	1.220	32.097	7.960	11.173
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.94
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.45
	AVERAGE TEMPERATURE: 42.016			
	SINK TEMPERATURE: 9.919			
4	1.233	31.165	8.280	11.622
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.85
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.27
	AVERAGE TEMPERATURE: 41.085			
	SINK TEMPERATURE: 9.919			
5	1.260	33.068	7.978	11.193
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.03
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			16.22
	AVERAGE TEMPERATURE: 42.987			
	SINK TEMPERATURE: 9.919			
6	1.253	32.334	8.118	11.391
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.96
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.94
	AVERAGE TEMPERATURE: 42.254			
	SINK TEMPERATURE: 9.919			
7	1.215	31.429	8.095	11.363
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.88
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			15.22
	AVERAGE TEMPERATURE: 41.348			
	SINK TEMPERATURE: 9.919			
8	1.260	32.571	8.097	11.364
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			1.99
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			16.08
	AVERAGE TEMPERATURE: 42.490			
	SINK TEMPERATURE: 9.919			
9	1.255	32.807	8.007	11.239
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.01
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			16.08
	AVERAGE TEMPERATURE: 42.727			
	SINK TEMPERATURE: 9.919			

TABLE 67. REDUCED DATA FOR FC-43 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 4FEB2200
THE POWER SETTING PER CHIP WAS: 1.7 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	1.634	38.334	8.928	12.532
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			23.25
	AVERAGE TEMPERATURE: 48.675			
	SINK TEMPERATURE: 10.342			
2	1.629	41.058	8.312	11.667
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.91
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			24.20
	AVERAGE TEMPERATURE: 51.400			
	SINK TEMPERATURE: 10.342			
3	1.622	38.200	8.894	12.483
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.59
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			23.03
	AVERAGE TEMPERATURE: 48.542			
	SINK TEMPERATURE: 10.342			
4	1.639	37.127	9.243	12.973
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.47
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			22.87
	AVERAGE TEMPERATURE: 47.468			
	SINK TEMPERATURE: 10.342			
5	1.674	39.665	8.843	12.412
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.75
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			24.33
	AVERAGE TEMPERATURE: 50.007			
	SINK TEMPERATURE: 10.342			
6	1.666	38.697	9.020	12.661
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.64
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			23.85
	AVERAGE TEMPERATURE: 49.039			
	SINK TEMPERATURE: 10.342			
7	1.616	36.896	9.171	12.872
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.45
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			22.46
	AVERAGE TEMPERATURE: 47.238			
	SINK TEMPERATURE: 10.342			
8	1.674	39.045	8.979	12.602
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.68
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			24.08
	AVERAGE TEMPERATURE: 49.387			
	SINK TEMPERATURE: 10.342			
9	1.669	39.113	8.936	12.543
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			2.69
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			24.04
	AVERAGE TEMPERATURE: 49.455			
	SINK TEMPERATURE: 10.342			

TABLE 68. REDUCED DATA FOR FC-43 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 5FEB0120
THE POWER SETTING PER CHIP WAS: 2.25 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.153	46.253	9.757	13.694
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.56
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.72
	AVERAGE TEMPERATURE: 56.541			
	SINK TEMPERATURE: 10.388			
2	2.147	50.348	8.938	12.545
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.12
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.85
	AVERAGE TEMPERATURE: 60.736			
	SINK TEMPERATURE: 10.388			
3	2.139	46.572	9.625	13.510
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.60
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			34.66
	AVERAGE TEMPERATURE: 56.960			
	SINK TEMPERATURE: 10.388			
4	2.161	44.476	10.180	14.288
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.33
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.90
	AVERAGE TEMPERATURE: 54.864			
	SINK TEMPERATURE: 10.388			
5	2.207	46.315	9.577	13.442
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.84
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.74
	AVERAGE TEMPERATURE: 58.703			
	SINK TEMPERATURE: 10.388			
6	2.196	47.146	9.763	13.704
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.68
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			35.90
	AVERAGE TEMPERATURE: 57.534			
	SINK TEMPERATURE: 10.388			
7	2.132	44.068	10.136	14.226
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.28
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			33.23
	AVERAGE TEMPERATURE: 54.456			
	SINK TEMPERATURE: 10.388			
8	2.208	47.710	9.701	13.615
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.75
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.41
	AVERAGE TEMPERATURE: 56.098			
	SINK TEMPERATURE: 10.388			
9	2.202	47.342	9.750	13.685
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			3.70
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			36.11
	AVERAGE TEMPERATURE: 57.730			
	SINK TEMPERATURE: 10.388			

TABLE 69. REDUCED DATA FOR FC-43 AND 7 MM SPACING

THE RAW Emf DATA ARE FROM THE FILE: 5FEB1340
THE POWER SETTING PER CHIP WAS: 2.9 W
THE DISTANCE TO THE FRONT WALL WAS 7 MM
ELECTRONIC LIQUID WAS FC-43

CHIP	QNET(W)	Tavg-Ts	Nu1	Nu2
1	2.747	52.452	10.983	15.415
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.42
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			46.58
	AVERAGE TEMPERATURE: 62.749			
	SINK TEMPERATURE: 10.297			
2	2.739	57.985	9.908	13.907
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			5.32
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			52.70
	AVERAGE TEMPERATURE: 68.262			
	SINK TEMPERATURE: 10.297			
3	2.730	53.520	10.617	14.901
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.65
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			49.35
	AVERAGE TEMPERATURE: 64.217			
	SINK TEMPERATURE: 10.297			
4	2.758	50.517	11.421	16.031
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.15
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			47.41
	AVERAGE TEMPERATURE: 60.914			
	SINK TEMPERATURE: 10.297			
5	2.817	55.855	10.575	14.844
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.96
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			52.46
	AVERAGE TEMPERATURE: 66.156			
	SINK TEMPERATURE: 10.297			
6	2.803	54.487	10.769	15.142
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.74
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			51.12
	AVERAGE TEMPERATURE: 64.784			
	SINK TEMPERATURE: 10.297			
7	2.721	49.905	11.428	16.040
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.05
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			46.26
	AVERAGE TEMPERATURE: 60.202			
	SINK TEMPERATURE: 10.297			
8	2.817	54.408	10.857	15.238
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.73
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			51.31
	AVERAGE TEMPERATURE: 64.705			
	SINK TEMPERATURE: 10.297			
9	2.809	54.266	10.855	15.236
	TEMP.BASED RAYLEIGH NUMBER * E-6 IS:			4.70
	FLUX BASED RAYLEIGH NUMBER * E-6 IS:			51.06
	AVERAGE TEMPERATURE: 64.563			
	SINK TEMPERATURE: 10.297			

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